International Manufacturing Centre

Warwick Manufacturing Group

Engineering Doctorate Thesis

Submission 5 – Innovation Report

Strategic and Large Scale Government IT Projects Management

... a tested methodological approach in the management and implementation of national ID Card programmes

By

Ali Mohammed S.M. Al-Khouri

B.Sc. (Hons.), M.Sc.

Submitted in partial fulfilment of the requirements for the award of an Engineering Doctorate

Submission Date: **24th December 2007**

DECLARATION

I, **Ali M. Al-Khouri** hereby declare that all the work presented within this innovation report was undertaken personally unless otherwise acknowledged within the text, and that none of the work has been previously submitted for any other academic qualification that has not been authorised by the University.

Contents

List of Tables

List of Figures

Acknowledgement

The dissertation process for the EngD degree is considered as a long, lonely, challenging, yet rewarding path to pursue. For me, it has indeed been a challenging process, but never lonely. It feels as though the process just began yesterday: a lot of reading, thinking, writing, discussion, frustration, and joy came along with the process. My sincere gratitude goes to all those people who have given me unconditional support, love, encouragement, and care throughout this process and who were fundamental for helping me to finish the dissertation.

I cannot thank enough HH Sheikh Saif Bin Zayed Al-Nahyan, the Minister of Interior, the Vice Chairman of Emirates Identity Authority's Board, for his support, and visionary guidance throughout my study journey from the time I got my first degree until this one.

Special thanks go also to H.E. Ahmad Nasser Al-Raisi and H.E. Dr. Saeed Al-Dhaheri for their support. Their input gave the entire project a focus on reality, and greatly added to the entire creative and evaluative process. They have helped to provide an inspiring work environment for my research during my work with them in the project.

Most importantly my heartfelt thanks go to all my family members and my little children, whose sacrifice, support, love, caring inspired me to overcome all the difficulties throughout my entire EngD program. This dissertation process would not be successful without their patience, love, and dedication.

Special thanks go to my supervisor, Dr. Jay D. Bal, whom I have been blessed by his considerable assistance throughout the journey of this research study. I am indebted to him for his unconditional support in many aspects, which enabled me to work on this exciting and challenging research study. Dr. Bal always had the ability to see the big picture, and to keep me focused on a goal that could sometimes be quite difficult for me to see. He has provided me with endless support, encouragement, and care throughout my study journey which are extremely valuable for an international doctoral student.

No matter how busy he has been, he has always found time to answer my frequent questions and solve the problems that I came across during my EngD programme. I cannot forget the relentless effort he made on modifying my papers and thesis. I also cannot forget the comforting words from his timely emails whenever I came across a challenging situation, and all those tough comments which pushed me to further improve my work. My limited vocabulary does not contain words that can express my gratitude to him.

I am also grateful to Dr. Kevin Neailey who has provided me with administrative support and for his comments, feedback and help on my research, in particular during the EngD conferences. My gratitude also goes to Dr. Mohammad Al-Moini, and Dr. Amanat from London Metropolitan Police for their constructive comments and shared experiences.

Abstract

This research focuses on the implementation of IT systems and public sector and national ID card projects in particular. Such projects have high expectations but low success rates. The study investigated the factors contributing to IT projects failure through on extensive review of the existing literature. This was enriched and tested by close involvement with the UAE national ID card project, surveys and in depth interviews with senior managers from other ID card projects and presentations and attendance at over 50 conferences on this subject.

Many of the factors leading to either success or failure identified in many practical studies could be addressed through a well designed project management methodology. Based on the literature, practical experience, observations and feedback from practitioners a project management methodology; named PROMOTE – **PRO**ject **M**anagement **O**f **T**echnology **E**ndeavours - was developed and tested for the planning and implementing large scale IT projects mainly in a government context. The US$200+ million dollar national ID programme in the United Arab Emirates was the main test vehicle. Its innovations include a hybrid systems development/project management customer based philosophy, a number of new tools and techniques and the introduction of a mentor for the project manager. To help assess the general applicability of the methodology it was also tested in the Saudi Arabia, Oman, and Bahrain national ID initiatives.

The methodology phases were refined several times (and other phases were added) to address the problems identified from UAE project, the literature, the experiences reported at GCC committee meetings and from other large scale implementations around the world (from conferences and study visits to other countries). From the testing conducted, the methodology is believed to add a significant contribution to the field of IT projects implementation and in increasing the success chances of such projects. Such success should have a profound impact on government services. The study also recognises that a better understanding of the new methodology and its contributions is only possible through further research and application in other large scale IT projects. This should allow the extension of the applicability of this methodology to a much wider spectrum.

Key Words: Project Management, Methodology, National ID Card.

Chapter
1

Introduction

Summary: *This chapter highlights the research aim, objectives, questions, and the scope of the research. It provides a short statement about the innovation generated and its contributions to the existing body of knowledge. It also provides an overview of the portfolio of submissions produced during the course of the investigation.*

1.1 Introduction to the Research

The proliferation of information and communications technologies (ICT) over the last decade has taken organisations worldwide by storm, and this momentum is expected to increase in the next few decades (Cairns, et al., 2004; Devadoss, et al., 2002; Riley, 2003). This uptake has been attributed largely to the fact that computers and information systems have demonstrated their ability to administer a profound impact upon organisational success by providing more efficient, effective, and accurate business processing capabilities.

In previous decades, the wealth of nations was determined by how efficiently and effectively they organised their industries and businesses to produce goods in the competing markets of the world economy. Now we live in an information age and the wealth of nations depends on how well they organise and manage the flows of information and knowledge in the competitive marketplace of a global economy (Grant, 1991; Drucker, 1988; DTI, 2003; Stiglitz, 1999).

Information and the technology that drives it provide a competitive advantage for organisations that can harness it and respond rapidly to the complex and ever changing markets of the 21st century (Bhatt and Grover, 2005; Olugbode et al., 2007).

The paradigm shift from industrial economy to informational economy has, as its critical distinction, the management of information in real or chosen time by firms which have the organisational, institutional and technological capacity to operate

as a unit within the economy (Davidow and Malone, 1993). The world economy of the industrial era, characterised by capital accumulation, has transformed into an informational age economy where the deregulation and the liberalisation of policies by governments and international organisations allow capital to flow freely across borders.

1.2 ICT and the Shadow of Failure

Among the many promises of the Information Communication Technologies (ICT) revolution is its potential to modernise government organisations, strengthen their operations and make them more responsive to the needs of their citizens (Binney & Williams, 1997; Burnes, 2000). However, it is essential that governments understand the level of complexity and the consequent risk in new IT projects (Axelrod 1999; BCS 2004; Carins et al., 2004; Chapman 2000; Devaux, 1999; Haller, 1998; Kauffman 2000; Xia 2004).

Hundreds of studies have shown that many IT projects have been disappointing and have not delivered the expected benefits (see for example: Cooke et al., 2001; Flare, 2005; GAO, 1992; Gartner Group View, 1999; Heeks, 2003; Huber, 2003; NZIM, 2003; Robbins-Gioia, 2002; Shetty, 2003; Standish Group, 2003; Tatnall, 2005).

Anecdotal evidence also indicates that there is only limited effective use of IT and that the huge investment in such programmes world wide has not delivered significant benefits in many cases to the organisations. On the contrary, there have been reports recently that say up to 60% of the productivity gains made in recent years have been due to ICT investment. Heeks (2003) reported in his survey results that most of the "*successes are at operational levels that automate basic clerical functions like data processing and that many of the partial failures are systems in which the operational component works, but in which the tactical or strategic management components do not work.*"

Other researchers indicated that a large proportion of the system development money (70%) is spent on systems maintenance. This raises serious issues about IS development practices (Canning, 1997; Lientz and Swanson, 1980). Some critics have referred to this as a 'crisis in system development' (Sibley, 1986; Martin, 1991). This has pushed many academic researchers to increasingly

believe that computer science itself may need to be rethought in light of these massively complex systems (Charette, 1995).

Table 1.1 shows distressing data on project failures from different surveys conducted in the last few years. Considering the hundreds of billions of dollars spent on IT projects in many countries around the world annually, the data from these surveys clearly indicate that a large proportion of the investment expenditure is likely to be wasted. This area was considered to be an important area to address for the economic development of a nation.

Table 1.1: Recent surveys of IT Projects

Survey	Year	Target Population	Results
Chaos Report - Standish Group	2003	14,000 IT projects in US	30% successful 70% challenged or failed
Oxford University & Computer Weekly	2003	Overall performance of IT projects in UK (both in private and public sectors)	16% successful 75% challenged 9% failed
KPMG Canada Survey	2005	1,450 public and private sector organizations	61% failed
Gartner	2003	System development projects	70% of funds spent on maintenance
OASIG Study	2005	UK	7 out of 10 fail
Robbins-Gioia Survey	2002	232 respondents from different industries	51% failed
The Conference Board	2001	executives at 117 companies	40% failed

Analysis studies conducted by professional groups identified several common reasons for project failures. They provide a wide range of examples of failed or out-of-control projects that are important to learning in order to help eliminate similar blunders. Table 1.2 shows some of the results of the Standish Group survey listing on the left the top ten project reasons why projects succeed and on the right the top ten reasons why projects are impaired and ultimately cancelled.

Table 1.2: Results of the Standish Group Survey (1995), The CHAOS Report

Rank	Project Success Factors	% of Responses	Project Impaired Factors	% of Responses
1	User involvement	15.9	Incomplete requirements	13.1
2	Executive management support	13.9	Lack of user involvement	12.4
3	Clear statement of requirements	13.0	Lack of resources	10.6
4	Proper planning	9.6	Unrealistic expectations	9.9
5	Realistic expectations	8.2	Lack of executive support	9.3
6	Smaller project milestones	7.7	Changing requirements and specifications	8.7
7	Competent staff	7.2	Lack of planning	8.1
8	Ownership	5.3	Didn't need it any longer	7.5
9	Clear vision and objectives	2.9	Lack of IT management	6.2
10	Hardworking, focused staff	2.4	Technology illiteracy	4.3
	Other	13.9	Other	9.9

For the most part, the findings of many research studies demonstrate that the recipe for project failure is dialled in from the beginning (BCS, 2007; Mullaly, 2005). Projects are too large and complex; their scope does not embrace the full magnitude of change required to ensure they are successful; governance and leadership is scattered, inconsistent and not committed to seeing through the change; projects are initiated without a clear business case; and the project managers and team members do not have the expertise and authority necessary to successfully deliver and the capacity to deliver all that the organisation chooses to take on (Davenport, 2000; Schmults, 2002).

There appears to be no magic formula that can guarantee project success, however the factors identified in the literature and the methods proposed are argued to increase the chances of project success.

1.3 ID Card Projects

One of the very ambitious projects many governments around the world have launched in recent years and many other governments are planning to initiate are national ID programmes. The literature classifies these as some of the largest and complex government IT projects since they involve many state-of-the-art

technologies that lay down a national technology infrastructure for many of the IT initiatives both in the government and the private industries (Al-Khouri and Bal, 2007).

These projects subscribe to what the literature characterised as the New Public Management (NPM) concept that emphasises the result-oriented performance in the public sector[1]. In the NPM model, citizens are treated as customers with governmental agencies expected to become more business-oriented and innovative.

Having seen many commercial enterprises gain significant benefits partly by getting closer to their customers such as Amazons personalisation through tracking of customer preferences many public bodies and governments are attempting to achieve the same benefits – being closer to their customers and providing better services through such schemes.

Another angle of such programmes is that the role of government is to provide infrastructure – hence a secure ID for electronic transactions is just one step further than the driving licences and conventional ID cards used to increase commerce by providing a uniform system for identity authentication. In fact, as digital government becomes a reality, the need for reliable digital identity becomes increasingly urgent (Camp, 2003).

These large scale and complex IT project poses real challenges to governments as many studies have reported (Henderson, 2006; Lemon et al., 2002; Stepanek, 2005). Inferring from the published statistics, such initiatives may have less than a thirty per cent chance of success.

The reasons large IT projects struggle are usually common; we know them, we can recite them, we advocate solutions for them, and yet the problems persist (Mullaly, 2005). The inescapable conclusion that must be drawn is that either we are not serious about taking actions on the problems preventing project failure, or what we are trying to do is just is not working or that we are applying methods that work (though badly as the data indicates) to an area that is maybe even more difficult than we anticipate (ibid.). Considering the high failure rate of IT

[1] The idea has also been developed based on the viewpoint that market competition and privatisation improves government responsiveness and efficiency, providing the rationale for the business model in the public sector.

projects around the world, national ID schemes have higher failure probabilities due to their size and complexity.

The consequences of failure could have a profound effect on government expenditure plans. Learning from the practices and the mistakes made in similar projects can provide governments with the knowledge to broaden their understanding and avoid falling into the same traps again. This is not easy though, since many of these projects are subject to national security issues and hence information is hard to obtain.

1.4 Motivation for the Study

Despite the number of publications and web sites about IT and IT projects, it was found that there is little qualitative published material around the management of IT projects. In project management literature, there are a lot of technical handbooks, which concentrate on project management processes and on how to run successful projects in different fields (Suikki et al., 2006).

The literature includes a wide variety of approaches to the management of information systems development. Longworth (1985) identifies over 300 information systems methodologies. Most come originally from practice (not from the academic community) and have been refined and blended in practice.

Although there are many claims about their benefits, methodologies have come in for much criticism (see for example Andersen et al., 1990; Herbst, 1974; Mathiassen, 1988; Unhelkar and Mamdapur, 1995). They are seen as over-complex, requiring special skills, inflexible, expensive, narrow in scope, and their use does not necessarily lead to increased productivity (Avison and Fitzgerald, 2003, pp. 542-55).

Fitzgerald (1996), Lyytinen and Hirschheim (1987), Wastell (1996), Whitley (1997) and Wynekoop and Russo (1995), among many others, supply supporting evidence. The problem is also seen in the methodologies recommended tools, techniques and templates that also have their detractors (ibid).

It is argued that they require staff education, training and consultancy (a considerable time and money overhead), they are difficult to integrate into the organisation and may cause at least an initial reduction in productivity and, they

do not guarantee success (Avison and Fitzgerald, 2003, pp. 341-3). Again, Stone (1993) and de Grace and Stahl (1993), among many others, supply supporting evidence.

Other researchers also identified limitations and risks in project management methodologies (White and Fortune 2002, Busby and Hughes 2004, Milosevic et al. 2001). The confusion in research results is reflected also in the swing by organisation's between standardised and tailored systems, and between formal and chaotic methodologies. Current research does not properly address the position of project management methodologies in the successes and failures of project management of IT projects.

The main criticism is that for a number of reasons methodologies do not seem to have accomplished their intended purpose: to organise and guide the work project activities (Baskerville, 1991; Episkopou, 1987). Even though there is a dearth of empirical research on the actual use of methodologies, existing evidence (e.g., Chatzoglou and Macaulay, 1996; Hardy et al., 1995; Russo et al., 1996) suggests that their use is limited in practice, and as far as they are used, they are not literally applied (Westrup, 1993).

Chatzoglou and Macaulay (1996), for example, report that nearly half of the projects (47 percent) did not use any methodology in their survey of 72 projects within the U.K., while another British survey (Hardy et al., 1995) reports a significantly different figure (18 percent) for the non-use of methodologies. Hardy et al. (1995) also report that 38 percent of methodologies were developed in-house and were customised in 88 percent of cases.

Similarly, Wynekoop and Russo (1993) report the findings of a survey of over 100 organisations that indicated that 65 percent of organisations had developed their own methodologies in-house and 89 percent of the respondents believed that formal methodologies should be adapted on a project-by-project basis.

In addition, there is literature, which covers the 'theory' of project management, its fundamentals, processes, methods, tools and practical cases, and ideas of success. However, it was noted that the examples in the existing literature are rarely of the size and complexity of national ID projects; the project domain that was explored in detail in this study. Proceeding without understanding and managing the risk inherent in such projects will obviously lead to higher probabilities of failure.

In addition there were other motivating factors to carryout this study. During the author's 13+ career life in the field of IT, he participated in many government focussed strategic IT initiatives. Almost all the projects that he was involved were challenged to keep the cost, scope and schedule constraints in equilibrium.

In undertaking this study, he therefore endeavoured to investigate the challenges that constrain IT projects and address them in the context of a methodology for managing such initiatives in an attempt to increasing their success probabilities.

The senior role of the author in the UAE national ID programme, and his involvement from its early stages, provided him with the authority and insight to undertake an action research viewpoint to achieve the research objectives. The research undertaken is considered to be the first in this field to provide detailed qualitative information on the implementation of national ID programmes.

It is also considered to be among the very few studies – no evidence of such studies could be found in the literature - to provide detailed insight information on the implementation of project management methodology in a large scale government IT project. This effort should contribute to understanding the important implementation elements which should in turn contribute towards better management of such endeavours around the world.

1.5 Research Aim and Objectives

The research focuses on the implementation of national ID programmes, and how these programmes can be better managed with the aid of a methodological framework to ensure a successful endeavour. Therefore the key aim of this research is *"to develop and test a project management methodology to support the implementation of large scale IT projects in general and national ID programmes in particular with a focus on the specific issues of such programs, recognising the current literature on existing methodologies and the learnings from other successful and failed projects."* To achieve this aim, the objectives of the study were to:

- **understand** the factors influencing the successful implementation of large IT projects;
- **assess** the current available methodologies for managing such programmes;

- **develop** an innovative management methodology to provide guidance to manage the national ID programme; and
- **experiment and fine-tune** the developed methodology and tools through industrial application,

The portfolio of work undertaken has addressed these areas. This innovation report explains how these objectives have been met.

1.6 Main Research Questions

The following research questions have been specifically framed to help gain an insight into the key issues related to the implementation of large scale IT projects:

1. What factors influence the successful implementation of national ID programmes?

2. Can a project management methodology better ensure that such programmes are successful and deliver the desired benefits to governments?

1.7 Research Method and Approach

The approach in this study was broadly qualitative in nature. The research was regarded as an interpretative case study action research that was found to better suite the requirements and objectives of the research. Data collection tools included participant observation, interviews, questionnaires, and document analysis. Further details of the research methodology are provided in chapter two.

1.8 Research Scope and Population

This research focuses on the implementation of a national ID programme in the United Arab Emirates and three GCC countries. As such, the robustness and viability of the methodology and the identified factors for success would need to be tested.

The study reports on the dynamics of adopting the methodology for managing the national ID programme in the UAE, the results may not be directly applicable to other implementation schemes. However, this study provides insights that can be used to understand and better manage similar initiatives set in similar contexts.

It is important to emphasise that any discussions and interpretations of results in this study may be compared to general IT projects only with caution.

The research also included primary data from other initiatives from many countries in Asia, Europe, and America. The information gained was used to enrich the discussion and enhance the developed application in this research study.

1.9 Significance of the Study: *The Research Engineer's Contribution*

The features that this research brings to current application of knowledge are summarised in the following points:

- A project management methodology for managing large government IT projects, but national ID programmes in specific named PROMOTE (**PRO**ject **M**anagement **O**f **T**echnology **E**ndeavours) is considered the primary contribution by the project. It sets standard phases and processes to control the project activities, promote effective communication, support scope and risk management, and ensure quality deliverables. It takes into account and addresses many of the identified factors in the existing literature leading to successful, failed, or out-of-control projects. The methodology has an advantage over the existing standard methodologies for these type of applications from the fact that it has been applied and derived through a live case study. This has not been done before with National ID card initiatives.

- The experimental work carried out in this study is the first of its kind to explore the field of national ID projects that provides an insight into the details of the implementation. The qualitative knowledge presented in the study is believed to benefit other governments in the overall management and planning of their implementations.

- Published guidance on how to conduct similar projects is usually from the point of view of the systems companies or from neutral auditors/consultants or academics. The viewpoints presented in this research are bipolar driven by the customers' viewpoint, but scrutinised and evaluated by those of an academic researcher.

In addition, the work carried out in this study is perceived to be of significant importance for both practitioners and researchers in government and private sectors:

- The study gathers evidence on the variety of considerations that influence the outcome of IT systems implementation in general (through literature review), and in specific national ID implementation (through the case study research).

- The study recognises the value of formal project management and proposes a tested methodology for more effective management of similar initiatives

- It helps governments protect their investments as it provides a model for managing and improving the implementation of their programmes.

- For solution providers/vendors, this research provides a detailed study of a national ID implementation that should improve their understanding of the pitfalls to avoid and of how to work more closely with client to deliver solutions that are more likely to meet business needs

- It provides understanding and answers to key obstacles facing G2C e-government initiatives, as it explored how national ID programmes if incorporated certain technologies, may well advance this area.

- This research adds to the limited knowledge currently available to practitioners and researchers about national ID programmes, and the field of G2C e-government.

1.10 Suggested Reading Order of the Submissions

There are five submissions in the engineering doctorate portfolio. In order to understand properly the context and the various elements pertinent to the study, readers are advised to follow an order of reading. As depicted in Figure1.1, the 'Executive Summary' is recommended by the author as the first documents to be read. The suggested order of reading of the submissions in this EngD portfolio is then according to their sequence from 2 to 5.

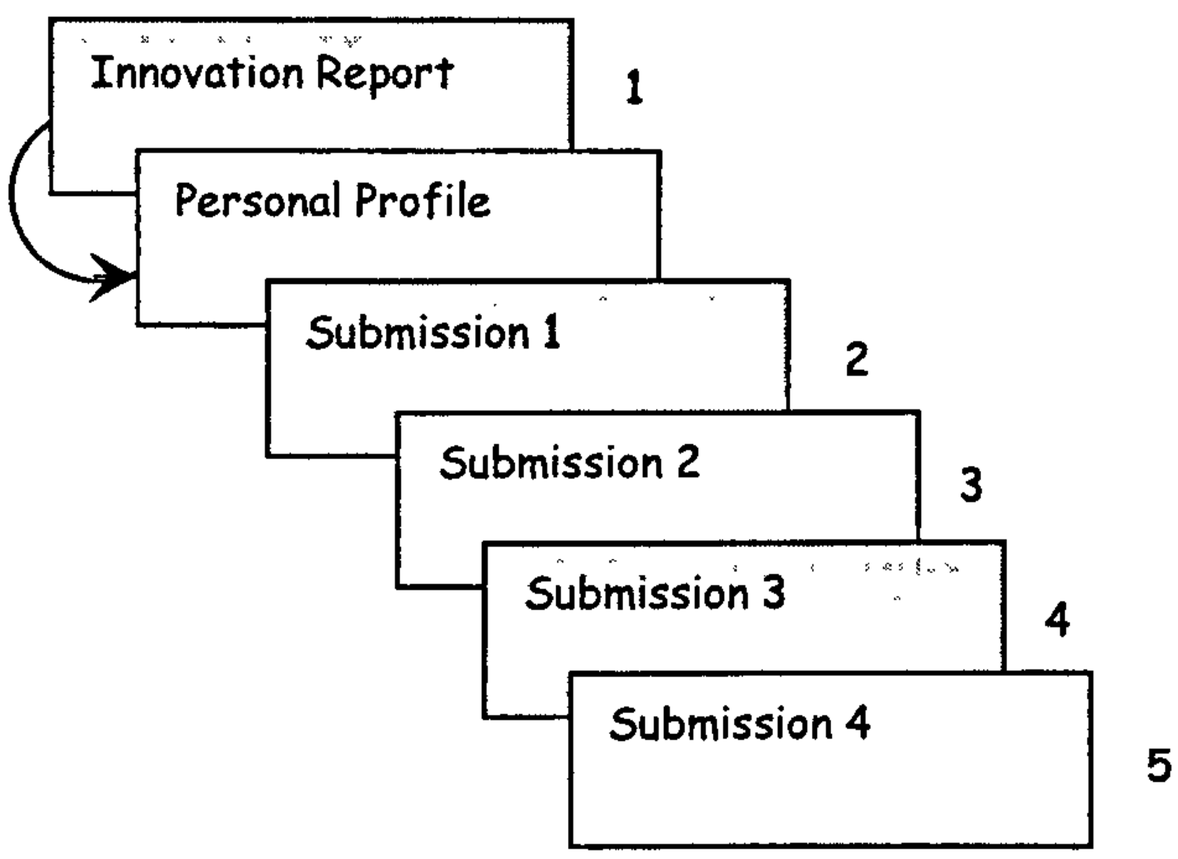


Figure 1.1: Suggested reading order of the submissions

The portfolio consisted of the above "integrated" deliverables to demonstrate how the methodology was derived and applied. It is considered to provide in depth detail of how to employ the new methodology in managing a large IT project, with focus on national ID projects. The submissions were designed such that they could be reused and with learning reapplied in managing similar projects.

There follows a narrative detail and main conclusions of each.

1. **Submission 1: UAE National ID Project Implementation - Phase I.**

   This submission addresses the implementation of the first phase of the methodology developed as part of this study. It provides an empirical insight into the implementation of phase one of the national ID project in the United Arab Emirates and how the methodology was tested in detail.

The adopted processes of the methodology provided guidance to the project management team for managing technical and operational issues. The implementation of the 1st phase of the methodology provided feedback for improvement on its components as some modifications were made to its structure and its overall arrangement, mainly related to planning of project activities (see chapter 4 for more details).

2. **Submission 2: UAE National ID Project Implementation - Phase II.**

This submission represents the implementation of the second phase of the proposed methodology. Project management literature was widely consulted to provide fundamental background information and to explain many of the approaches and processes adopted in the proposed methodology.

The submission revealed many of the challenges and pitfalls faced during the course of phase two implementation that were considered critical to the successful application of the new methodology. In addition to those identified from the existing literature, the submission also presented some of the techniques and templates developed and tested by the author within this research to facilitate the management and implementation of various project planning and control activities.

As a result some fundamental modifications and additions were made to the methodology to address critical project management functions. Chapter four provides details on this.

3. **Submission 3: UAE National ID Project Implementation - Phase II.**

This submission provides a comprehensive overview of the current literature on e-government, and relates this information to the issues surrounding the implementation of the national ID card schemes, and how they can support the progress and development of such initiatives (specially the Government-2-Consumer aspect).

The survey study conducted as part of this submission revealed that e-government G2C initiatives are progressing but at a slow rate due to the lack of a trusted and secure medium to authenticate the identities of online users. The research study concludes that national ID schemes will play a major role in helping governments reap the benefits of e-

government if appropriate measures were undertaken in the overall planning and implementation of the project.

It concludes that the utilisation of the three technologies (smart cards, PKI, biometrics) can add a new dimension to the current debate about the real value of national ID schemes. A simplified conceptual model showing the relationship between national ID cards and e-government was presented. A prototype of the model was developed and presented to authorities in the GCC countries.

It was decided by the countries to incorporate the model and the prototype in the higher level G2C e-government strategies for further developments. A paper on this published in the Journal of Computer Science was abstracted by the MIT Sloan Management Review and received an award at a major Government conference.

As part of the survey process, feedback was obtained from more than 64 participants representing 26 government organisations on the methodology and their areas of concerns in large government IT projects. The feedback, obtained via questionnaire and structured interviews was used to check how the new methodology addresses such concerns, and introduce improvement where applicable.

4. Submission 4: System and Card Evaluation.

Considered as one of the important tools recommended in the new methodology to confirm software quality, this submission provides a short evaluation and assessment of the national ID card and system in the United Arab Emirates using ISO 9126 standard.

The findings of the evaluation highlighted many areas where the system needed further enhancement to address before its final acceptance. The study concluded that the use of quality frameworks and models may well contribute to project success as it can detect and then allow us to address risks and issues of concern at an early stage of the project.

It was found that the adopted evaluation framework contributed significantly towards improving the quality of the system, without which, the highlighted shortcomings in this study would have gone undetected and the system accepted in its current immature state.

It also included a comparison between the designs of other international ID cards to highlight the similarities and difference, and the current standards and applications around the world. This allowed the author to develop an approach for evaluating smart ID cards.

The approach was primarily used to evaluate the UAE and GCC ID cards and clarify the level of security in the ID card chip, with reference to the algorithms and key length requirements against any potential forgery, as well as the certification requirements needed for the different components in the overall architecture.

5. **Submission 5: Innovation Report –** a methodology for managing strategic and large scale government IT projects.

   This submission presents the developed methodology, and a summary of the testing results, and puts the methodology in its context. It emphasises the innovative aspects of the research study and draws overall conclusions. It also includes an evaluation of the UAE system to measure its success based on Lyytinen and Hirschhiem's (1987) recommendations which emphasise highly the role of stakeholders.

   The evaluation showed that the UAE system was viewed as a success in all dimensions but was required to address certain areas to enhance the perceptions of certain stakeholders. Interviewed GCC officials and experts in the field viewed this to provide good basis on which a project can be evaluated to determine the level of its success or failure.

   The innovation report also contains the *personal profile* (pasted in Appendix-F) that describes the development of the author's personal competences and the mastery of the required competencies, achieved through the project work and modules undertaken. The personal profile also provides a summary of personal competences developed and how it altogether fulfilled the requirements of the EngD program.

1.11 Report Organisation and Content

This innovation report is divided into eight chapters. As depicted in Tables 1.3, the content of this report is designed around layout and guidelines proposed by senior staff in WMG.

Table 1.3: Innovation report structure (Ref. Paul Roberts)

Content	Reference in this submission
Introduction Intro. to the Project The Main Themes The structure of the Project Overview of the submissions Order of reading the submissions	Chapter 1: Introduction
The Research: how this research was conducted, its purpose and aims	Chapter 2: Research Methodology
Scope of the study: What it includes and what it doesn't tools employed in conducing the research	Chapter 1: Introduction Chapter 2: Research Methodology
Review of the Key Issues: the problems facing large IT projects implementation	Chapter 3: Review of the Field
Measurements: how to measure successfulness of the research tools and the proposed methodology.	Chapter 2: Research Methodology Chapter 3: Review of the Field Chapter 7: Demonstration of Innovation Appendix-B: UAE project evaluation Appendix-F: Personal Profile
Creating the application: the proposed methodology	Chapter 3: Review of the Field Chapter 7: Demonstration of Innovation
Implementing the application: how it was implemented	Chapter 4: PROMOTE Methodology Chapter 7: Demonstration of Innovation Appendix-B: UAE project evaluation
Results of the implementation: what was gained from this implementation and what it showed different	Chapter 4: PROMOTE Methodology Chapter 5: Methodology Comparison Chapter 6: Reflection Chapter 7: Demonstration of Innovation
Demonstration of Innovation:	Chapter 1: Introduction Chapter 7: Demonstration of Innovation
Conclusions Proposals for future extension of this work	Chapter 8: Conclusion

In this chapter, the nature and the scope of the problem investigated, and the significance of the study have been described. In addition, the research aims, objectives and questions were stated. The context in which the study took place was also outlined and an overview of the research design and approach was provided. The following chapter discusses in detail the research design and approach followed.

Chapter

2

Research Methodology

Summary: *This chapter highlights the general characteristics of the methodology followed in this research study. The research philosophy and reasons for going about the selected research approach are clarified and reviewed in detail. Research phases and the primary research methods employed in the study are also discussed.*

Research methods are adopted for a variety of reasons. Blaikie (1993) suggests these reasons vary from matching methods to the objectives of a research project through to particular methods being the preference of the researcher. Whatever methods are adopted underlying each is a particular world view and one of the tasks of the researcher is to ensure that methods, taken together, form a coherent research approach.

Sharp & Howard (1996) define research as:

> *"Seeking through methodical process to add to one's body of knowledge and, hopefully to that of others, by the discovery of nontrivial facts and insights"*

Cornford & Smithson (1996) write:

> *"something important is to be found out, revealed or discovered, and this task is to be approached in a scholarly fashion. By this we mean in a methodical and self-conscious manner and in such a way as to give rise to new facts of insights that are backed by appropriate evidence... a research approach requires that both the process of discovery and the results of investigations be set down and communicates in an appropriate manner and in such a way that they can be shared with the wider community of interested parties." (p.33)*

By and large, the way in which research is conducted may be conceived in terms of the research philosophy subscribed to, the research strategy employed and the research instruments utilised (and perhaps developed) in the:

(1) pursuit of a goal: the research objective(s), and
(2) quest for the solution of a problem: the research question(s) or aim.

The research aim and objectives as outlined in Chapter 1 is *"to develop a methodology that supports the implementation of large scale IT projects in general and national ID programmes in particular through a focus on the specific issues of such programs."* To achieve this aim, the objectives of the study were to:

- understand the factors influencing the successful implementation of large IT projects;
- assess the current available methodologies for managing such programmes;
- develop an innovative management methodology to provide guidance to manage the national ID programme; and
- experiment and fine-tune the developed methodology and tools through industrial application.

The purpose of this chapter is to:

(1) discuss the research philosophy adopted in relation to other possible philosophies;
(2) expound the research strategy and design, including the research methodology adopted;
(3) introduce the research instruments that were developed and utilised in the pursuit of the research goals.

2.1 Research Philosophy

A research philosophy is a belief about the way in which data about a phenomenon should be gathered, analysed and used. The term epistemology (what is known to be true) as opposed to doxology (what is believed to be true) encompasses the various philosophies of research approach.

The purpose of science, then, is the process of transforming things *believed* into things *known*. Two major research philosophies have been identified in the Western tradition of science, namely positivist (sometimes called scientific) and interpretivist (Galliers, 1991). Table 2.1 shows an overview of the differences between the two approaches.

Table 2.1: Scientific and Interpretivist approaches

Positivist (Scientific)	Interpretivist
defined as methods that are studied, can be described and observed in an objective manner, where from those observations general results can be derived.	sees the world of information system as something that can only be 'interpreted', never fully specified or reduced to theories.

2.1.1 Positivism

Archer (1988) defined the positivist as the position that facts and values are distinct, and scientific knowledge consists only of facts. The positivist method has its origins in the school of thought within the philosophy of science known as 'logical positivism', which reflected the precepts informing the study of natural phenomena.

Positivists believe that reality is stable and can be observed and described from an objective viewpoint (Levin, 1988), i.e., without interfering with the phenomena being studied. They contend that phenomena should be isolated and that observations should be repeatable i.e., predictions can be made on the basis of previously observed and explained realities and their inter-relationships. This often involves manipulation of reality with variations in only a single independent variable so as to identify regularities in and to form relationships between, some of the constituent elements of the social world.

Thus, positivist research views the study of society and human behaviour as scientific in the mode of natural sciences. It can be implied that the positivist approach is based on the existence of fixed relationships within phenomena which are typically investigated with structured research tools and in the setting environment.

Therefore, this approach serves primarily to test a theory in an attempt to develop an understating of that phenomenon. Formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about the phenomenon from the sample to a stated population were criteria that Orlikowski and Baroudi (1991) used to classify the 'theoretically grounded positivist research.'

Moreover, mention should also be made of another type of positivist research, 'descriptive positivist research'. In this type of research, there is no theoretical grounding or interpretation of the phenomena. The researchers would present what they believed to be straightforward 'objective', 'factual', accounts of events to illustrate some issue of interest to the information systems community. The criterion for 'descriptive positivist research' according to Orlikowski and Baroudi (1991) is premised on what the researchers were considering in their exposition.

The positivist approach had been explicitly recognised, and advocated, as the natural science model of social science research, and found widespread application in the information system area in the 1980s. It is *"so embedded in our society that knowledge claims not grounded in positivist thought are simply dismissed as non scientific and therefore invalid"* (Hirschheim, 1985, p.33).

As a piece of evidence, Orlikowski and Baroudi (1991) examined the literature in four major information systems journals from 1983 to 1988 and found that 96.8% of the literature fell into the positivist category. Alavi and Carlson (1992) also found in their review of 902 IS research articles that all the empirical studies were positivist in approach. Postivism has also had a particularly successful association with the physical and natural sciences.

There has, however, been much debate on the issue of whether or not this positivist paradigm is entirely suitable for the social sciences (Hirschhiem, 1985), as many authors called for a more pluralistic attitude towards IS research methodologies (see e.g., Kuhn, 1970; Bjorn-Andersen, 1985; Remenyi and Williams, 1996). Indeed some of the difficulties experienced in IS research, such as the apparent inconsistency of results, may be attributed to the inappropriateness of the positivist paradigm for the domain. Likewise, some variables or constituent part of reality might have been previously thought un-measurable under the positivist paradigm - and hence went un-researched.

2.1.2 Interpretivism

In contrast with the positivist, there is another school of thought named 'interpretive approach.' It focuses on human interpretations and meanings related to IS as social life is perceived as emerging from the shared creativity of individuals. Research by Interpretivism is still a minority approach in the IS field, although the development of Interpretivism has made positivism less dominant than previously (Walsham, 1995).

Interpretive researchers attempt to understand phenomena through accessing the meanings that the participants assign to them as they contend that only through the subjective interpretation of and intervention in reality can that reality be fully understood – something that this research study aims for (Remenyi et al., 2000).

Therefore, the phenomenon is examined in its natural setting and from the perspective of the participants, which leads to endeavours to understand the deeper structure of a phenomenon within cultural and contextual situations. However, the research techniques emerging from phenomenology and interpretative paradigms emphasise a constructive approach where there is no clear cut objectivity or reality.

Gibbons (1987) gave a concrete view of this interpretive approach showing how the interpretive perspective attempts to understand the inter-subjective meanings embedded in social life and hence to explain why people act the way they do. He stated:

> *"The contribution of the interpretive research philosophy is that it reveals the underlying connections among different parts of social reality, by examining the social rules and meanings that make social practices possible."*

Supporting the above point of view, Orlikowski and Baroudi (1991) claimed that the aim of all interpretive research is to understand how members of a social ground, through their participation in social processes, enact their particular realities and endow them with meaning, and to show how these meanings, beliefs and intentions of the members help to constitute their social action.

The use of qualitative research stresses this socially constructed nature of reality, the intimate relationship between the researcher and what is being explored, and the situational constraints which share the process (Henwood and Pidgeon, 1993). The result of a qualitative study is thus understanding rather than the development of rules or laws. Schofield (1993) suggests that generaliseability is best thought of as a matter of 'fit' between the situation studied and other situations to which one might want to apply its conclusions.

Quantitative research relies on developing metrics (numbers) that can be used to describe phenomena under study. Qualitative methods are defined as those which eschew metrication and seek other means of capturing and analysing data (Cornford & Smithson, 1996). Qualitative research is associated with Galliers 'interpretivist' approach. Table 2.2 further clarifies the differences between the positivist research perspective and the interpretive research perspective.

As staged in the comparison table (Table 2.2), positivism and interpretivism are different schools of thought, which can be seen from the way each perceive the world, their attempts to understand phenomena, and the aims of each piece of research. These differences affect the role of the researcher while conducting the research, the approach and method that the researcher takes to collect and analyse data, and the expectation toward the participants.

Table 2.2: Comparison between positivist and interpretative research approaches

Issues		Positivist	Interpretive
1.	the way to perceive the world	The social world exists independent of humans. The nature of social reality can be un-problematically apprehended, characterised, and measured in some objective ways.	Social reality is understood to be reproduced through ongoing interactions, which cannot exist apart from humans. The social world is produced and reinforced by human through their action and interaction.
2.	attempt to understand phenomena	How to set and construct the set of appropriate model and measurement to capture the essence of phenomena	how and why individuals, through their socialisation into, interaction whit, and participation in, a social world, give it a certain status and meaning.
3.	aims	Concerned with the empirical testability of theories, whether this requires theories to be verified or falsified in order to search for universal principles.	To understand how members of a social group, through their participation in social processes, enact their particular realities and endow them with meaning, and to show how these meaning, beliefs and intentions of the members help to constitute their social action.
4.	the role of researcher	To discover the social reality by using appropriate tools to detect and gauge the dimensions of the focused topic	To interpret the social reality. Social system is recognised as meanings are formed, transferred, negotiated, and used. The interpretations of reality may shift over time as circumstances, objectives, and constituencies change.
5.	approach taken by researchers	Hypothetic-deductive approach. The event is only explained when it can be deduced from certain principles and premises.	Social process cannot be explained in hypothetical deductions, covariance's, and degrees of freedom. Instead, understanding social reality requires understanding of how practices and meanings are formed and informed by the language and implicit norms shared by humans working toward some shared goal.
6.	common data collecting methods	Sample surveys, control experiments	Field studies, observations, interview
7.	common data analysis methods	Inferential statistics	Describe, interpret, analyse, and understand the social world from the participants' perspective.
8.	role of participants	To express their experiences in terms of the researcher's constructs through questionnaire items	Allow participants to use their own words and images, and to draw on their own concepts and experiences

Source - adopted from: Morgan, 1983; Putman: 1983; Chua, 1986; Fay, 1987; Gibbons, 1987; Rosen, 1991; Orlikowski and Baroudi, 1991

2.2 Research Paradigm

Although the interpretive approach in the IS field has been increasingly recognised, the debates on these two approaches continue (Orlikowski and Baroudi, 1991, Walsham, 1995). Some suggest that possibility of combining both approaches to improve the quality of research (Gable, 1994; Zuber-Skerrit, 1992).

This research tried to avoid what may be characterised as methodological monism, i.e., the insistence on using a single research method. This is not due to an inability to decide between the various merits and demerits of the various alternatives. Instead, it is believed that all methods are valuable if used appropriately, that research can include elements of both the positivist and interpretivist approaches, if managed carefully.

The over-riding concern was that the research undertaken should be both relevant to the research questions, as set out in chapter one, and rigorous in its application. An eclectic methodological approach combining both quantitative and qualitative paradigms is ideal in many respects so that the strong points of one can counter balance the weakness of the other.

Typically, technology related research is evaluated quantitatively by looking at the cause and effect within relationships. The quantitative research paradigm seeks to uncover the uniformities of social life and render such uniformities into precise, numeric forms that lend themselves to formulae, and experimentation.

Quantitative findings, drawn from standardised measures that fit diverse opinions and experiences into predetermined categories, are broad generalisations (Orum et al., 1991). However, as Fitzgerald et al (1985) point out that:

> "The concern with information systems and the relationship to organisations and society is not the same as the study of information system or computing as purely technical phenomena. The relationships of concern are closely related to human activities and involve the study of experiences, attitudes, values, effects and responses, as well as more traditionally technical aspects. This being the case, it would seem to lead to the rejection of a purely scientific approach to the investigation of these relationships" (Fitzgerald et al., 1985, p.4)

This study has adopted an eclectic methodological approach combining both quantitative and qualitative paradigms. It is ideal in many respects in that the strong points of one can counter balance the weakness of the other. However, this study was undertaken within the culture of phenomenological inquiry. Phenomenology focuses on understanding a phenomena in its own terms, attempting to bring the researcher as close to the actual experience as possible.

Within the phenomenological culture of inquiry, this research was guided by a constructivist orientation. Constructivism guides research by the premise that "to understand this world of meaning one must interpret it" (Schwandt, 194, p.118).

The focus is experience and perception with the view that "what we take to be objective knowledge and truth is the result of perspective" and that "knowledge and truth are created, not discovered" (ibid.). Constructivism emphasises the idea that concepts, models and schemes are developed to help make sense of experience and that these constructions are continually tested and modified in the light of new experience.

It is to be emphasised that phenomenological understanding embraced by this study clearly called for an 'open' approach to interpreting meaning rather than empirical testing of pre-defined notions or hypotheses (Miles & Huberman, 1994, p.8). Many common threads link the wide assortment of methods that are contained within the qualitative research paradigm (Gubrium and Holestein, 1997).

First amongst these is a working scepticism, which motivates this research. Interpretive research is popular for understanding, and seeking to shake the conventional appraisals often arrived at through quantitative methods.

Second, interpretive research maintains a commitment to close scrutiny, coming into direct contact with the subjects of the study. Such scrutiny allows for a detailed understanding of social life to emerge through the research. This concern for detail also allows the qualitative researcher to pay strict attention to the 'qualities' of experience, which are most often neglected in quantitative research. This argument is based on the premise that a good understanding of the qualities of the world are required prior to attempting to explain, predict, or modify it.

Third, interpretive research focuses on process, perceiving the world as 'fluid and elastic' (Gubrium and Holstein, 1997, p.12). The assumption that people are active agents of their own affairs leads qualitative researchers to focus on how actors participate in, construct, and experience life. The qualitative paradigm also recognises the subjective as an integral feature of social life.

Although this subjectivity is often criticised for being unsubstantiated by rigorous research procedures, the "reluctance to standardise data collection and unwillingness to sacrifice depth for generality are matters of analytic necessity, not technical inadequacies. A world comprised of meanings, interpretations, talk and interaction must be scrutinised on its own terms" (Gubrium and Holstein, 1997, p13).

Finally, interpretive research, is oriented to uncover the intricacies of human interaction and circumstance. This should lead to the understanding of the historical and social context, and also social relations, which possibly influence human perceptions, attitude, and interaction toward the design, implementation, and use of information systems in organisations. Ignoring these influences may cause a deficiency in the analysis of the information system phenomena because the IS system has to be implemented in an organisational context which cannot deny the involvement of human beings from the beginning of the implementation process.

These identified factors determined the researcher's choice to approach the research study by using the interpretive scheme, which focuses particularly on human interpretations and meanings. Walsham (1995) emphasised that the method for such interpretive investigations is often the in-depth case study, where research involves frequent visits to the research site or direct involvement and participation over an extended period of time.

An eclectic approach incorporating a methodological triangulation was used to collect and analyse data from the research. The methods employed yielded:

1. qualitative data: from the UAE case study through active participation, observation, and
2. quantitative and qualitative data: from interviews, focus group discussion and documentary analysis.

The apparent merit of the triangulation is that the research is not method-bound. It, therefore, avoids the potential flaws and bias of a single method approach (Easterby-Smith et al, 1997). The eclectic approach will further complement the strengths and weaknesses of the diverse positivist and phenomenological methods to give a broader, fuller and well balanced picture of the issues under investigation.

The complete nature of human interaction and motivation make it impossible for these to be decomposed into measurable component that are required for a purely positivist approach. These complex issues lend themselves much more readily to an interpretive approach. Therefore, a phenomenological paradigm for this research project was adopted.

This would place this project within the qualitative methodology. However, in order to gain greater insight into the research problem, techniques were borrowed and adapted from both the positivist and phenomenological paradigms at the various stages of the project. The appropriateness of the qualitative paradigm in this study is based on several factors:

- The implementation of a new IT programme and adoption of a methodological approach for managing such initiatives is fundamentally about new thinking and new behaviours. It is therefore, logical that the research design should allow for detailed exploration of various stakeholders and their perception of the issues in a natural setting.

- The impact of the new technology and the subsequent changes in behaviour and working practices is ultimately a subjective process. Subjectivity is inherently recognised in all qualitative research methods.

- The implementation of national ID programme and the factors leading to its successful implementation and adoption within the government sector has not been formally evaluated. Qualitative research is well suited for uncovering the unexpected and exploring new avenues (Marshall and Rossman, 1995).

- The quality of qualitative research "lies in the power of its language to display a picture of the world in which we discover something about ourselves and our common humanity" (Silverman, 1997, p.19). this quality enables the research itself to become a mutual learning experience.

2.3 Action Research Study

This study was planned and developed as an action research project. The aim of action research is to 'bring about practical improvement, innovation, change or development of social practice, and the practitioners' better understanding of their practices" (Cohen et al., 2001, 227). The term action research highlights the essential features of action and research, which involves the systematic testing of ideas in practice to improve social conditions and increase knowledge (Hatten et al., 1997).

Action research lies within the domain of formative and evaluation research (Mouton, 2001). It implies that the research is undertaken to evaluate a real life problem, seek and plan systematically for a solution to the problem, implement the solution, and evaluate whether the intervention was successful.

Action research is considered as the most demanding and far-reaching method of doing case study research – discussion on cases is provided in section 2.4. Lewin (1946) was the first to use the term 'action research'. He viewed it as a way of learning about organisations through trying to change them. Action research always involves two goals: (1) to solve a problem and (2) to contribute to science. It allows both the researcher and the participating organisation to learn and develop competence. Action research is primarily applicable to the understanding and planning of change in social systems.

Action research does not limit itself to the understanding of the process and communicating it, but includes participating, using this understanding to suggest ways in which desirable change might take place, and even monitoring the effectiveness of these attempts, actually amounts to 'self-evaluation'.

The cyclical nature of the action research made it more appropriate for this research study. Action research as described by Lewin (1946) proceeds in a spiral of steps composed of planning, action, observation, and an evaluation of the result of the action as depicted in Figure 2.1. The last phase may lead to planning for further action.

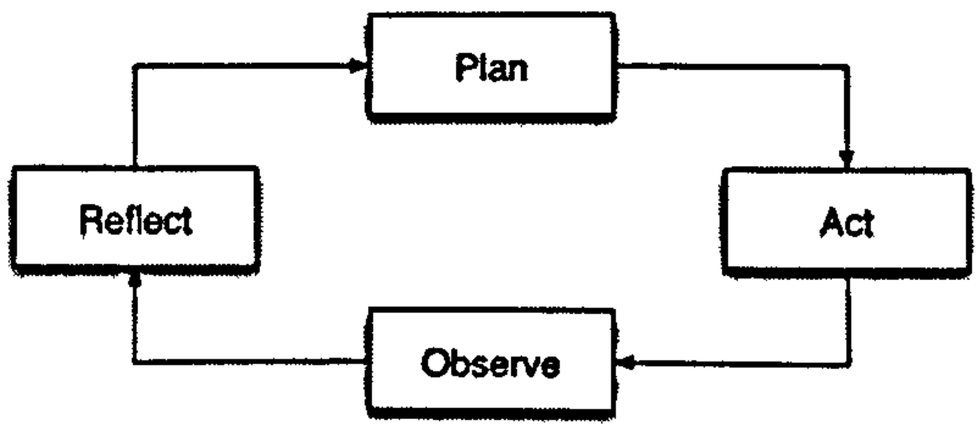


Figure 2.1: Action Research Cycle

The action research includes the following activities:

1. **Plan:** this phase is concerned with the development of a plan of critically informed action to improve current practice. The plan must be flexible to allow adaptation for unforeseen effects or constraints.

   The action research process in our study began with a problem identification and general idea that an improvement or change in the IT project implementation field is desirable.

   After a systematic process of analysis of the problem, and formulation of research questions, a strategic plan for action on how to address the problem was outlined. The plan in our case is the development of the new project management methodology; PROMOTE.

2. **Action/Implementation:** In this phase the strategic plan (proposed methodology) is implemented. The project members (researcher and organisation) act to implement the methodology (plan) which is deliberate and controlled.

   The researcher works together with the organisation(s) and focus their improvement strategies on the 'thematic concern' (Hart & Bond, 1995, p.54; Kemmis & McTaggart, 1988, p.8-9).

3. **Observation/evaluation:** The researcher observed the outcomes of the strategic plan (methodology) in this phase to collect performance evidence which allows thorough evaluation and further refinement of the concepts. The observation was planned and recorded. The action process and its effects within the context of the situation were observed individually and collectively;

4. **Reflection:** In this phase of the action research cycle the researcher reflected critically on the results of the evaluation, i.e., on the whole action taken and the research process itself. Reflection of the action (i.e., proposed methodology) recorded during observation was usually aided by discussion among the project members.

   Reflection from project team members, officials in GCC and from other visited countries, experts and practitioners interviewed during conferences

led to reconstruction of some part of the methodology and provided a basis for further planning of critically informed action, thereby continuing the cycle.

As a consequence of this doctorate study these steps were carried out in a more careful, systematic and rigorous way than that which usually occurs in daily practice (Kemmis & McTaggart, 1988; Zuber-Skerritt, 1992).

A number of different data collection methods (see Table 2.5) were used to ensure that the reflection stage of the action research process could be performed. The Data collection process is discussed in more detail in sections 2.6 and 2.7.

Ottosson (2003) uses the term participation action research and claims that researching management and especially change management would be very difficult if not impossible without the application of action research. This is because development processes are generally very complex and unique in any organisation; they are truly irreversible so that the formulation of standard solutions is impossible. Reliable information needs then to be based on unfiltered daily interaction and unspoken information between the researcher and the studied process.

However, there is less reliance in action research studies on the trappings of traditional research such as validity, reliability, and generalisability. The argument here is that the results of an action research study can provide enough contextualisation to guide another researcher in their own study.

Working within one department or organisation, researchers can process the outcomes of their research to benefit their local areas. "There is an expectation with action research that it will result in some practical outcome related to the lives or work of the participants" (Stringer, 1996, p. xvi).

A number of characteristics of action research, that are important for this research, can be identified (Checkland, 1999; Checkland and Scholes, 1990): the researcher forms part of the change process, it is a collaborative process between the research and the people involved in the problematic situation, there is a practical outcome, the focus is on social practice and the researcher is a change agent.

The definition of change agent places the emphasis on the change agent as outsider, manipulating the clients to accept the innovation. However, the role that the change agent plays in action research is different. The one important difference is that there is collaboration between the researcher and the client. The client researcher relationship is characterised by Bennis as quoted by Foster (1972) as a:

- Joint effort that involves mutual determination of goals;
- Relationship growing out of mutual interaction of the client and change agent; and
- Relationship where each party has equal opportunities to influence the other.

Figure 2.2 identifies the environment within which the action research took place as well as defines the framework, methodology, and application area based on the research done by Checkland and Scholes (1990). Two areas can be identified for action research, one in which the practice is taking place and one in which the research about specific aspects is taking place.

Mathiassen (1998) distinguishes between research and practice for action research in terms of the purpose, the intellectual framework that underlines practice and research, the applied processes, and the shared arena within which practice and research takes place.

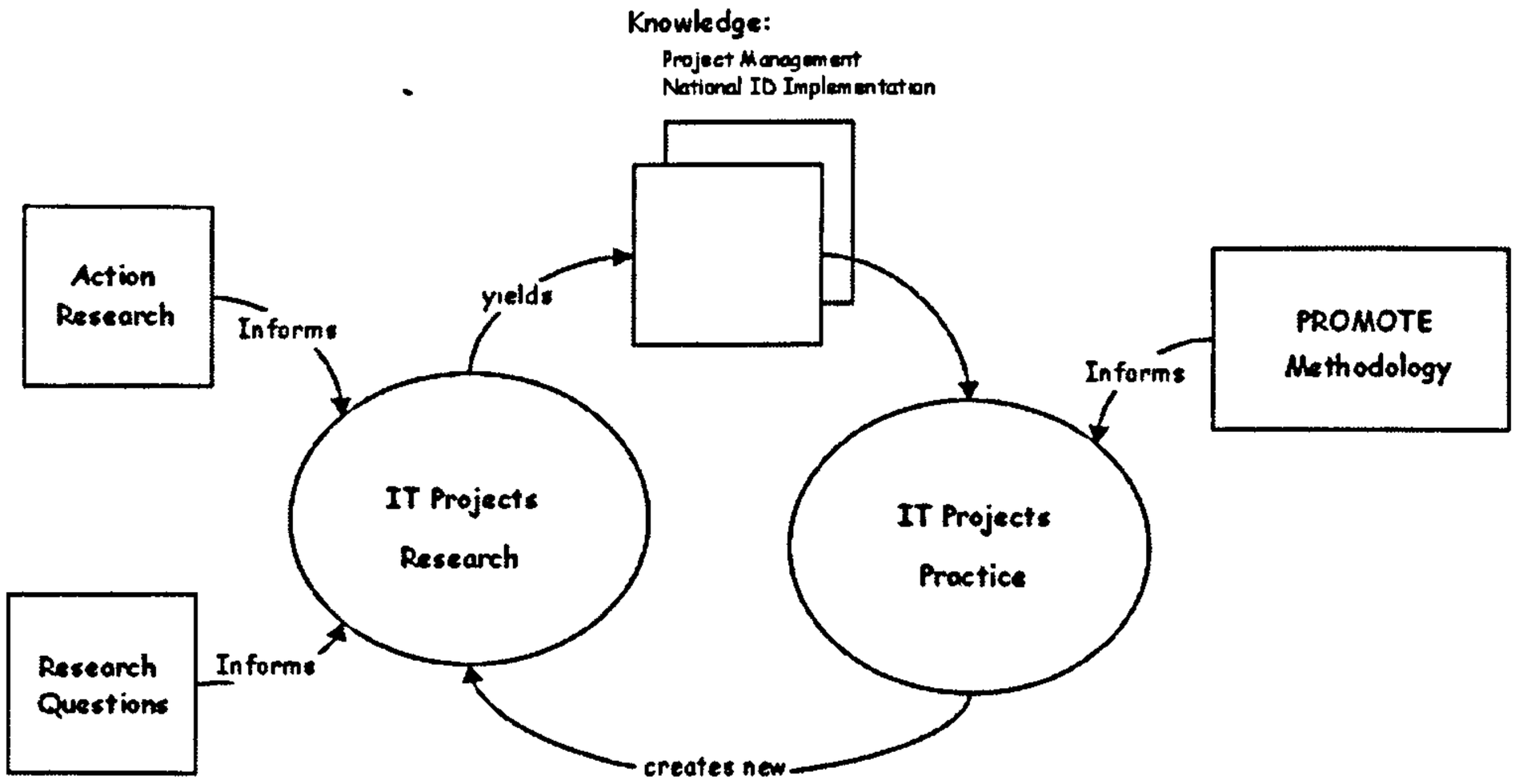


Figure 2.2: Research Environment

The research undertaken in this study expresses a coherent view of practice and research with two different modes of inquiry, a research and a practice mode. This is expressed in Table 2.3 based on Checkland's ideas on how intellectual frameworks are used in relation to specific application areas (Checkland and Scholes, 1990, p. 283).

Table 2.3: Relation between practice and research

	Research	**Practice**
Purpose	To develop knowledge to understand, support, and improve project management practices in large government IT projects to ensure successful implementation	Improve the project management of government IT projects
Framework	Project Management Existing methodologies Related theories	PROMOTE Methodology
Process	Action Research	Reflection in action
Arena	IT project Management Practice	IT project Management Practice

The table explicates the related purposes of research and practice, the underlying intellectual frameworks, the type of process in which they are applied, and the shared arena to which they are applied.

In the practice the purpose of the action research is to change and improve project management within the framework of the new proposed methodology (i.e., PROMOTE) and by getting input from countries implementing similar projects, as well as experts and practitioners. The research activity is primarily informed by IT project management and systems development practice, but supported by various reference disciplines (e.g. general systems theory, general measurement theory, etc).

Also, because of the complex and contradictory nature of IT projects and systems development practice, dialectic reflections were used to help understand the critical success factors involved in practicing and improving the PROMOTE methodology (Robey, 1995; Mathiassen, 1998).

Action research is best executed with case studies (Cohen et al., 2001); an approach that this study has adopted, and that is discussed next.

2.4 Interpretive Case study Research

This research is regarded as an interpretive case study action research as highlighted earlier above. Case studies are increasingly being used as a research strategy in business, economics, management science and other fields concerned primarily with (1) understanding complex social phenomena and (2) the rigorous presentation of empirical data (e.g., Hamel, 1992; Perry & Kraemer, 1986; Yin, 2003).

Case study research is normally defined as a study which examines a phenomenon in its natural setting to get information from a few people, groups or organisations (Benbasat, 1984; Bonoma, 1985). The research boundaries may not be clearly defined at the commencement of the research and no experimental control or manipulation is used.

Yin (1989a, b) defined a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and when multiple sources of evidence are used.

Case studies are considered to be an invaluable research tool in adding to understanding, extending experience and increasing conviction about a subject e.g., evaluation of organisational performance, project design and implementation, policy analysis and relationships between different sectors of an organisation or between organisations (Stake, 1995 see also Cohen & Manion, 1997).

Many researchers have tried to draw common characteristics from case study research. Some examples include Benbasat et al. (1987) and Yin (1994), as shown in Table 2.4.

Table 2.4: key characteristics of case studies

Benbasat et al. (1987)	Yin (1994)
1. phenomenon is examined in a natural setting. 1. Data are collected by multiple means. 2. one or few entities (person, group, or organisation) are examined. 3. the complexity of the unit is studied intensively 4. case studies are more suitable for the exploration, classification and hypothesis development stages of the knowledge building process; the investigator should have a receptive attitude towards exploration 5. no experimental controls or manipulation are involved 6. the investigator may not specify the set of independent and dependent variable in advance 7. the results derived depend heavily on the integrative powers of the investigators 8. changes in site selection and data collection methods could take place as the investigator develops new hypothesis 9. case research is useful in the study of 'why' and 'how' questions because these deal with operational links to be traced over time rather than with frequency or incidence. 10. the focus is on contemporary events	1. Investigates a contemporary phenomenon with its real-life context 2. Copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result 3. Realise on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result 4. Benefits from the prior development of theoretical propositions to guide data collection and analysis

It can be generalised that case study research deliberately focuses on the study of the phenomenon in its natural setting. It does not divorce a phenomenon from its context or concentrate on only a few variables as in some research types such as laboratory experiments, and surveys. Although a survey also deals with phenomenon and context, it still has limitations in terms of the number of variables to be analysed, and the number of questions that can possibly be asked.

Often, the in-depth case study research in the IS field is conducted in longitudinal form, which includes the historical reconstruction of earlier periods and the unfolding of events during the research period. Pettigrew (1990) said that:

> *"The longitudinal comparative case method provides the opportunity to examine continuous processes in context and to draw in the significance of various interconnected levels of analysis. Thus there is scope to reveal the multiple sources and loops of causation and connectivity so crucial in identifying and explaining patterns in the process of change."*

Nevertheless, case study research still is believed to be one of the most challenging of all social science endeavours (Yin, 2003). Yin (2003) points to the fact that the case study approach has not been globally accepted by researchers as reliable, objective and legitimate because it is often difficult to generalise from a specific case, plus the amount of time they take and the volume of documentation they generate.

To reply to such criticism, Craig (1989) explained that statistical generalisation could be considered as the result of findings for one who employed the positivist perspective. Whereas, the interpretive stance aimed to explain 'how' and 'why' questions related to the focused issues, the validity of research depend on the plausibility and cogency of the logical reasoning used in describing the results from the cases, and in drawing conclusions from them.

A similar theme on the non-generalisation of case study research was argued by Yin (1994). He used the terms 'analytic generalisation' for case study research to create a contrast with 'statistical generalisation'. Case studies are generalisable to theoretical propositions and not to populations or universe. Also, the 'analytic generalisation' aimed to expand and generalise theories and not to enumerate frequencies as in statistical generalisation because cases are not represented as sampling units.

Although various arguments related to carrying out case study research are presented, Benbasat et al. (1987) crystallised the reasons why case study research is applicable to information system research and which also explain the reasons for undertaking this research work:

- Firstly, the research can study information systems in a natural setting.
- Secondly, the case method gives an opportunity for the researcher to search for 'how' and 'why' questions in order to understand the nature, complexity, and relationships of the processes which take place. It is also because such questions deal with operational links that need to be traced over time.

- Finally, the case study is an appropriate way to search an area in which few previous studies have been carried out.

"The essence of a case study, the central tendency among all types of case study, is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result." (Scharamm, 1971)

2.5 Research Design

Research methods always impose a specific perspective on reality (Berg, 1998). That perspective, characterised by the assumptions and intent of the researcher, is invariably reflected in research design. Yin (1989a, b) suggests that there are five key elements to research design:

1. study questions,
2. study propositions
3. units of analysis
4. logic linking the data to the propositions, and
5. criteria for interpreting findings.

Each of these elements has been developed with careful consideration of the subjective nature of the change processes. What represents a difficult and fundamental change to one person, may be second-nature to another. For this reason, it was decided that the research design needed to be flexible and accommodating of the need for change when and where necessary.

Flexibility has been incorporated by what Huberman and Miles (1994) term a 'loose' research design. Loose research designs are inductively oriented, and work especially well with unfamiliar and complex subjects. Finally, in designing the research, it was also important that the research itself represent a learning experience. In seeking to better understand the factors that lead to successful implementation of IT projects with a focus on national ID schemes, the research design has adopted an exploratory approach over an expository one.

2.6 Research Phases

Different research approaches were used during the course of this research study. Data collected came from primary and secondary sources. Preece (1994) defines a primary source as "*information that involves the researcher in direct experience and observation of the real world, in so far as that term has meaning.*" Additionally, he defines a secondary source as "*information that has already been sifted and structured by someone else, albeit for quite legitimate reasons.*"

Secondary sources came from journals, books and articles that provided the information for literature reviews and identification of current practices in the areas under investigation, and to address some of the research questions listed in submission 1.

A case study approach was used to gain an in-depth understanding of the implementation of UAE national ID project, technical details, and the success factors as well as those factors that may drill down the project – explained in detail in submission 2.

From a global perspective, the research undertaken in this study consisted of three phases (see also Table 2.5):

2.6.1 Phase 1 – Field Review:

The purpose of this phase was to review existing research in order to develop sharper and more insightful knowledge about the topic (Yin, 2003). Multiple data collection methods were employed in this study in order to obtain a rich set of data surrounding the research issue, as well as capturing and relating its contextual complexity.

2.6.2 Phase 2 – Project Management Methodology Development:

This phase involved the development of a project management methodology for application in the UAE national ID programme. The methodology was designed to promote the overall management of project activities in the UAE programme and as a route to increasing the project management skills and competences for managing similar initiatives.

2.6.3 Phase 3 – Testing of the Methodology:

The methodology was tested mainly in the UAE national ID programme. The qualitative data of the study is therefore coming from one country. Due to confidentiality and criticality of these high profile government projects, it was not possible to obtain qualitative data from another implementation.

However, the methodology was communicated to many government officials and experts in the form of workshops and conference presentations. The workshops involved detailed training of the methodology and were delivered as part of GCC executive management committee.

Three countries showed interest in the methodology workshops, used and provided feedback in the quarterly committee meetings. Feedback from experts and government officials during conferences and official delegation visits contributed to the overall evaluation and enhancement of the PROMOTE methodology. Table 2.5 provides a summarised overview of the research phases undertaken in this study, and the employed methods and techniques.

Table 2.5: Phases, methodology, and methods utilised in this research

Research Phase	Research Method	Data	Research Techniques	Activities
Field Review (documented in submissions: 1, 2, and 3)	Case study		• Documents • Searches on the Internet	• Literature Review • Visits to exhibitions, conferences
Project Management Methodology development (documented in submissions: 1, and 2)		UAE national ID Programme	• Documents • Observations • Participation	• Literature Review • Multiple visits to countries implemented or in the process of implementing national ID programmes (Italy, US, Malaysia, Tunisia, France, UK, Kuwait, Bahrain, Saudi Arabia, Oman, Qatar) • Experts' and users' feedback (e.g. conferences, GCC management committee) • Enhancement of the proposed methodology
Methodology testing (documented in submissions: 1, 2, 3, 4 and executive summary)		UAE national ID Programme GCC executive management committee Government officials from several visited countries worldwide Experts feedback from attended conferences	• Documents • Observations • Participation • Questionnaire, Interview	

2.7 Primary Research Methods

The author's involvement in the UAE national ID card programme provided him with opportunities for making personal observations of the staff in their natural working environment. This helped him place them in context and make sense of the methodology. His senior role in the project allowed him to fully engage with the staff at all levels of the organisation, while at the same time, try to understand that setting through personal experience, observations, interactions and discussions with other project members. This provided a first hand exposure of the quality of the experience.

Direct observations as Merriam (1998) explains help to obtain descriptions of, and impressions about, the physical setting, participants, activities and interactions, and other more subtle factors such as unplanned activities, nonverbal communication and dress. It is important to stress that the author's personal observations in the UAE programme were used to make sense of, and provide richness to the PROMOTE development methodology and its phases.

The feedback from the GCC executive management committee, government officials and experts during conferences and delegation visits contributed to the enhancement and endorsed the value of the methodology.

2.8 Data Analysis

Denzin and Lincoln (1998) emphasise the need in qualitative research for a structured approach to data management. This they define as the operations required for a systematic, coherent process of data collection, storage and retrieval. In keeping with these suggestions, this stage was concerned with collecting and documenting high quality data, which would be easily accessible and identified for the analysis phase which was to follow.

Data was analysed on a continuous basis from the start of the data collection activity. Erlandson et al., (1993) note that *"the analysis of qualitative data is best described as a progression... [which] begins the first day the researcher arrives at the setting"* (p.111).

Notes from participation, observation, interviews and meetings were re-read and analysed so that they could be used to highlight lessons learned from the participants and outline the areas that required further exploration (Glense, 1999). These assessments were also used to improve the data collection process.

Following on from this, in performing the data analysis, the suggestions put forward by Dey (1993) and Denzin and Lincoln (1998) concerning 'content analysis' and making 'proper sense' of the data were considered essential in providing appropriate procedures and processes upon which the findings, interpretation and conclusion drawing could, more constructively, take place.

Data analysis was conducted by a through reading of all of the collected data and a simple sorting of data into context themes that were presented in the previous submissions. In support of this approach, Merriam (1998) reports that data analysis is a process of making sense out of the data. It can be limited to determining how best to arrange the material into a narrative account of the findings. More commonly, researchers extend analysis to developing themes "... *that interpret the meaning of the data."* (p.192).

Seidman (1998) notes that researchers sometimes let the narrative of the participant's experience from interviews speak for themselves. He suggests that the researcher must identify the threads among these experiences and understand and explain the connections.

However, it should be recognised that such categorisation of the identified themes is simply another way of organising the data (Erlandson et al., 1993). Discussing these themes from data collected during the research process provided a mechanism to construct meanings and interpretations of the data.

Having discussed the overall research methodology, the following chapter starts off by reviewing the key factors identified in the literature contributing to the failure or success of projects, and presents the need for a methodological approach to managing large scale IT projects.

Chapter

3

Review of the Field

Summary: *This chapter provides a overview of the literature reviewed in the course of the research. A detailed discussion on these topics is provided in the previous submissions. The overview summarises the subject of national ID projects – the core subject of this research study. Considering national ID projects as large IT initiatives, the chapter presents the thinking around the management of such endeavours. It also presents definitions and identified contributing factors to IS failure as part of the process to develop a better understanding of 'failure'. These were used to help define a framework to evaluate the case study project undertaken. This process is described in Appendix-B. The enhanced project management ideas developed – the main theme of this research - and their application are introduced to highlight their potential contribution towards project success.*

3.1 National ID Projects

With the advances in information technology, governments realised the benefits that integrated technologies such as smart cards, biometrics, and public key infrastructure to improve the total security of their national identity systems. One core project that many governments have initiated (e.g., Italy, Spain, Belgium, Hong Kong, Singapore, Malaysia, etc.), and many others are considering is the national ID card programme.

In some countries there is strong opposition against such initiatives, and there have been many groups warning of the failure of ID card projects. In the UK for example, there have much criticism of the national ID project plan for being too complex, technically unsafe, overly prescriptive and lacking in public trust, factors which together are likely to make it another doomed failure (LSE, 2005).

Others argue that the technology envisioned for this scheme is, to a large extent, untested and unreliable, and that no scheme on this scale has been undertaken

anywhere in the world (Ballard, 2006; EFF, 2002; Kent & Millett, 2002; Lamb, 2005; McCue, 2004). Others oppose such initiatives on the grounds that they will undermine privacy and lead to the setting up of Big-Brother monitoring systems by the government where they can look down up on them from a single national database and that in the absence of protective laws and a bill of rights, identity cards are going be used as a weapon against minorities (Goldman, 2004; Griswold, 2001; Hunt, 2002; Lynch, 2000; Matthews, 2002; Sturgeon, 2004; see also some older articles: Berry, 1994; Davis, 1995; Simon, 1995).

Many researchers agree that governments are not providing sufficient information on national ID programme agendas, implementation strategies, and future applications (UK House of Commons, 2004). The literature indicates that governments are not making sufficient effort in developing a clear framework to demonstrate how they will achieve their objectives, nor they have provided empirical evidence to assist research in this field (Privacy International, 2004).

Opponents are using such aspects to attack and defeat government attempts to launch such projects. However, many countries seem to be going about the implementation of national ID systems with a great deal of enthusiasm despite the criticism.

Governments around the world have been very active in promoting their national ID schemes - and responding to oppositions and public concerns - by drawing attention to the advantages of such programmes through public debates, periodical reports and white papers. Their argument is based on the fact that a modern national ID system is essential in an era where identity theft is growing with horrific impact on governments, businesses, and citizens.

It is worth highlighting that the total value of identity theft crimes reached US$56.5 billion in 2006 in USA alone (Privacy Rights Clearning House, 2006). They also cite crime, terrorism and immigration control as other reasons for implementing such programs.

Pushed by technology solution providers with aggressive marketing, governments seem to be convinced that unlike traditional identification documents such as passports or driving licenses, the new generation of ID cards and documents are being developed with security features that virtually defy counterfeiting and tampering. They employ sophisticated verification systems that can read,

decode, process information and review certain relationships and security elements buried in the card to validate authenticity (Bates, 1998; Zalud, 2003).

Whether or not the proposed technologies will work in a national ID scheme is one matter. The problem area as researchers and opponents of the scheme point out is that governments have an appalling track records in IT projects (Gardiner, 2007). Large government projects usually fail because too many objectives are bundled into one project (Gardiner, 2007).

Recent studies estimated the cost of implementing this type of large IT project to be of multi-billion pounds (sterling) level (Fontana, 2003). The UK ID project for instance is projected to cost more than £5.6 billion to set up and run over the next 10 years, according to the latest Home Office figures (Simpson, 2007). The nature, size and complexity raise the failure probability of these projects (Hencke, 2005).

It is a generally accepted phenomenon by both academics and practitioners that information technology projects have very high failure chances and that between 60 to 70 per cent do actually fail in some respect. Other researchers argue that the actual figure might be far more frightening since many organisations tend not to disclose such experiences, due to fear of criticism by audit or the media (Collins, 2006; Cross, 2002; Fichter, 2003).

3.2 Information Systems Failure

Most surveys of ICT projects have been in the commercial sector. There have been far fewer surveys of ICT projects in governments. It is estimated that between one-fifth to one-quarter of industrialised country government ICT projects fall into the total failure category; one-third to three-fifths fall into the partial failure category; and that only a minority fall into the success category (Heeks, 2003).

Survey evidence from developing countries is very limited too. Table 3.1 summaries some of the studies conducted.

Table 3.1: Case study results

Developing countries	• Health information systems in South Africa: widespread partial failure of high cost systems with little use of data (Braa and Hedberg 2000). • IS in the Thai public sector: "failure cases seem to be the norm in Thailand at all governmental levels" (Kitiyadisai 2000). • Donor-funded IT projects in China: all were found to be partial failures (Baark and Heeks 1999). • World Bank-funded IT projects in Africa: almost all were partial - often sustainability - failures (Moussa and Schware 1992).
USA & UK	• Costs to corporate America $80 billion to $145 billion (Reported by Standish Group International.) • US: £125 million failure of CONFIRM Travel reservation system • US: £45 million failure of the Californian department of motor vehicles project and Florida's bungled attempt to automated is its state benefits system. • UK: failure of a £16.5 million project to computerise the Inland Revenue returns process • UK: in 1993 the London Stock Exchange terminated its automated share settlement system at a cost of £75 million. Taking into consideration the Taurus debacle, this figure grows to £500 million. • UK: the 17-year project to automate the Department of Social Security in 1997 was deemed to be over budget by 400 per cent.

Source: (Heeks, 2003); McManus & Wood-Harper (2003, p.17)

Researchers argue that government IT project failures are a global phenomenon (Cross, 2002; Gauld, 2006). To explain this, other researchers pointed out that government IT projects and unlike the private sector, face unique challenges as they operate in a different environment (LeFevre, 2006; Schwartz, 2004). Flowers (1996) points out that the delivery of successful IT projects, and creating value within the government sector is associated with situationally specific constraints when compared to the private sector. These constraints are outlined in Table 3.2.

Table 3.2: Typical government IS characteristics

Factor	Typical government IS development
Politics surrounding the development and operation of IS	Priorities may be refocused: for instance as a result of changes in government policy. Impositions for external deadlines: primarily for political reasons
Decision making	Highly bureaucratic decision making processes. High level of public interests and oversight
Management	Short term tenures of managers overseeing projects
Lead from	Technology led
Uniqueness	Custom systems rather than package preferred
Cost	Low cost solutions not sought

Adopted from Al-Wohaibi et al, 2002, p.6

Recognising Flowers (1996) work, Intellect (2000) outlined in its report *Getting IT Right for Government*, some of the main differences comparing the successful private sector IT projects with public sector projects. Table 3.3 provides a summary of these differences.

Table 3.3: Differences between private and public sector IT

Successful private sector projects	Public sector projects
Focused on measurable financial and service outcomes	Have multiple aims, so hard to measure success
Business driven by competition	Generally not in competition with other projects
Often not visible to public or shareholders	Highly visible to the public and the media
less constrained by legislation and regulation	Constrained by government legislation
Open to risk taking	Managed in a risk averse culture
Designed to limit damage when they are in difficulty	Difficult to adapt to change because of scale and complexity
	Likely to interact with other departments

Source: Intellect (2000) Getting IT Right for Government.

Although the figures for success and failure across the government and private sectors may be comparable, researchers argue that government is publicly funded, so it should aim for higher rates of success than of the private sector (POST, 2003). Despite such expectation, government project failures, however, become a manner of public record (Mullaly, 2005). The literature indicate that this is attributed to the fact that government IT projects are often of a significant scale, and tied up in the much larger transformation of service delivery and process change and still are managed as being primarily IT projects (ibid).

In a report published on 19 September 2006, a non-profit organisation; Work Foundation: said that government executives were too *'gung ho'* about IT programmes and projects, and had lost millions of pounds in taxpayers' money as a result (Jones and Williams, 2006). The report stated that executives need to lose their "reckless streak" and concentrate on what is practical:

> *"Too many government IT projects fail to deliver the promised benefits because public sector managers have a reckless streak - they become dazzled by the potential of the technology and lose sight of what is practically deliverable... Government should not be about cutting edge innovation, but about serving citizens well and efficiently. The private sector can afford the luxuries of innovating - in the public sector, IT needs to work."*

In addition, the literature recognises that large government IT projects have two very conscious and distinct streams of opportunities they attempt to achieve:

(1) *administrative*: the organisation identifies continuing improvement and enhancement activities; and
(2) *political*: tied to the imperatives and priorities of the (elected) government.

The second imperative may have higher influence on kicking off large and complex IT initiatives, where less attention is given to how such projects may contribute to improvement or the adding of value.

Studies indicate that large-scale projects fail three to five times more often than small ones (Charette, 1995; Henderson, 2006). Large-scale IT projects are almost by definition messy, high risk and uncertain (Mullaly, 2005). Researchers point to the fact that IT failures can stunt economic growth and quality of life and

that the cost of failure may become catastrophically excessive as societies come to rely on IT systems that are ever larger, more integrated, and more expensive (Charette, 1995).

Although it would be hard to tell how many software projects fail worldwide or how much money is wasted as a result, if we define failure as the total abandonment of a project before or shortly after it is delivered, and if we accept a conservative failure rate of 5 percent, then billions of dollars are wasted each year on bad software (ibid.).

While going over budget is not unique to the IT industry, it is increasingly familiar in respect of the size of the discrepancy between initial estimate and ultimate cost (Humphrey, 2004). The recent project "National Programme for IT" in the UK NHS (NHS, 2005) was originally costed at around £6,000m, whereas a recent official report estimates that the eventual cost may be double that and some reporters have even predicted £20,000m before delivery is as originally planned (NAO, 2006).

The accepted reasons why large IT projects fail are many and various, but include all the following as Henderson (2006) pointed out:

1. There is too much optimism as to the potential benefits of IT and as to the cost of delivering those benefits;
2. There is too little investment at the beginning;
3. Sufficient investment is made eventually, but is too late;
4. There is not enough technical know-how in the project team, as projects embark on implementing new or unproven technology;
5. There are opposing Human Factors aspects - including insufficient consideration of teams, project management and risks;
6. The project does not plan incremental roll-out and fails to anticipate the effect of big-bang on the organisation;
7. The project tries to match IT to the existing Business Processes of the organisation, rather than mandating that the Business Processes change to match those implicit in the IT;
8. Initial underinvestment leads to an investment legacy, where the project has invested in bad decisions and doesn't have the courage to retreat;

9. There are many management disaster scenarios such as:

   (a) parent/child governance scenario - where authority within the project remains with senior management in the customer,

   (b) the enthusiastic builder scenario - where the supplier has a vested interest in prolonging the project since payment is related to time-on-the-job rather than delivery of results;

10. Projects can run into trouble due to the vendors' inability to meet commitments.

11. And of course, because of insufficient planning and simply because projects take a long time from inception to completion, there is a requirements explosion during the lifetime of the project (poor estimates or weak definitions of requirements at the project planning stage) which means that what is eventually required is significantly different from what was originally anticipated.

Many researchers pointed out that many of today's failures are avoidable (Avison & Wood-Harper, 1990; Bentley, 2002; Berkun, 2005; Broder; 1999; Curtis, 1998; Lam, 2003; Radosevich, 1999). They argue that many of the projects fail because of foreseeable circumstances and that organisation's need to give careful attention to several factors to reduce failure.

One of the most widely quoted factors contributing to failure is that organisations tend to treat IT projects from purely technological perspectives, and not give much attention to other organisational issues. The literature shows that the technology can contribute as little as 15 percent to the overall success of projects (as depicted in Figure 3.1), where as the remaining 85 percent is dependent on bigger organisational issues related to people, data, and management as illustrated in Table 3.4 (Jawad, 2003).

Perhaps one explanation for such IT orientation proposed by some researchers' is that because there are no Laws in the sense of Laws of Physics, manager after manager will convince themselves that the failure phenomenon and critical success factors do not apply in their particular circumstances (Henderson, 1998).

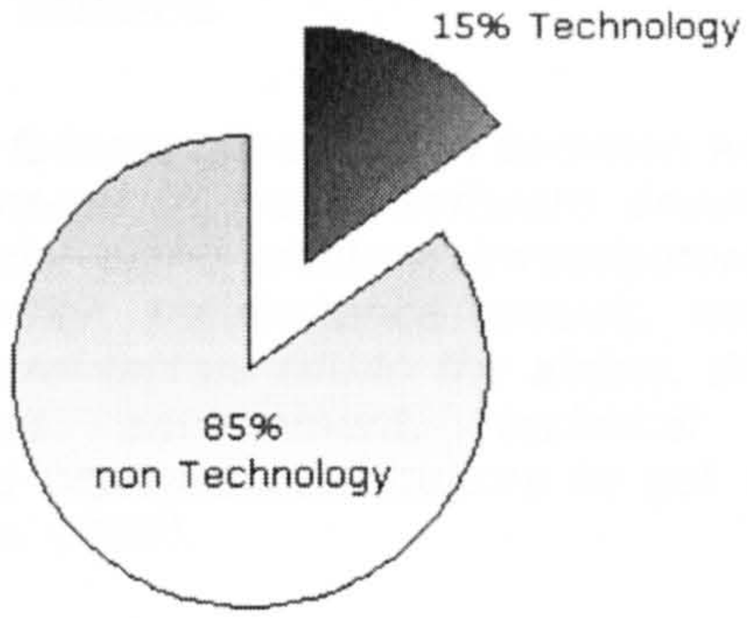


Figure 3.1: Critical Success Factors - Technology Vs. Non-Technology

Table 3.4: Critical Success Factors

Technology	People	Data/Information
Ease of use	Top management IT awareness	Data/Info availability
Enhancibility	IT managers business understanding	Data/Info. Validity
Current technology	IT staff technical capabilities	
Proven technology	User maturity	
Openness of the system (OSI)	User acceptance	
Off-the-Shelf	User involvement	
	Top management support	
	Management	
Organisation-related	Project-related	Management-related
Clarity of business objectives	Realistic project objective	Project management methodology
Organisational structure	Accurate statement of requirements	Use of independent consultant
Internal Communication	Stable user requirements	Supplier analysis
Organisation previous IT experience	Sufficient time for completion	Supplier competence
IS strategy	Considering hidden costs	Client-supplier relationship
IT standards	User training	Contract terms
IS champion	Technical training	Piloting the project
Sufficiency of financial resources	Project manager	Feasibility study
Government general regulations		

Before deeper discussion, a definition of failure that could also provide some basis to measure the work undertaken in this research study (i.e., to measure the success or failure of the UAE national ID system and the contributions of the proposed methodology) is provided next.

3.3 Understanding failure

> *"Software project failures have a lot in common with airplane crashes. Just as pilots never intend to crash, software developers don't aim to fail. When a commercial plane crashes, investigators look at many factors, such as the weather, maintenance records, the pilot's disposition and training, and cultural factors within the airline. Similarly, we need to look at the business environment, technical management, project management, and organisational culture to get to the roots of software failures"* (Charette, 1995).

The literature, in general, has divided IT projects into three main categories:

- *Succeeded*: The project is completed on time and on budget, with all features and functions as initially specified.
- *Challenged*: The project is completed and operational but over-budget, over the time estimate, or offers fewer features and functions than originally specified.
- *Impaired*: The project is cancelled at some point during the development or implementation cycle.

However, despite extensive studies the concept of IS failure has remained ambiguous and ill-defined. It has been found that studies of IS failure are based on superficial failure concepts such as the described previously. Many researchers argue that the depressing reality that IT projects studies divulge should not be taken with complete pessimism (see for example: Gilbreath, 1986; Rain, 2005).

They refer to the fact that the great majority of IT projects simply do not go as well as originally planned, and cost more than anticipated. Such projects should not necessarily be viewed as failures. They argue that comparisons of relative project performance must not be made simply on the achievement or non-achievement of their time and cost targets or goals, in fact, it must be viewed in the light of the circumstances affecting each project (McManus & Wood-Harper, 2003).

Rain (2005) proposes to label such projects as 'discouraging success' instead of calling them a failure. He argues that almost all IT projects are discouraging success, where they actually do not meet expectations, admittedly, with a few elephantine catastrophes in the mix.

Many IT failures have to do with perceptions and expectations of the *value* their delivery rather than absolute bankruptcy of purpose, wherein the major purpose

is accomplished but not without a good deal of frustration and inefficiency, and a sour taste in the mouths of many users (Rain, 2005).

Nonetheless, one cannot deny that almost all of the productivity gains in many industries have arisen from exploiting IT, and it is a fact that many of today's organisations cannot operate without their IT systems. Using IT projects as a vehicle for organisation change is becoming more prevalent, not less (Mullaly, 2005).

However, there are few very prominent examples of success where whole industries have been revolutionised. Such success examples and stories in the field of IT still represent a very low percentage. One can only imagine the kind of revolution IT would bring if the success rates of such endeavours were 90 percent or above.

3.3.1 Values and IS failure

Considering that the term 'failure' contains many definitions, Kling (1980) suggests that the notion of IS failure must contain a 'pluralistic components' involving a rich variety of existing perspectives. Ulrich (1983) suggests the foundation of such a notion must lie in social values (see also Curtis, 1998; Earl, 1996). These social values are presented in the IS by objectives and goals and state in more specific terms what should be achieved and how.

Certainly, value is an important aspect of life. It represents different things to different individuals and is built around our social and cultural background. Values are largely formed and perceived by the community as a whole rather than by an individual.

Individual groups may hold different perceptions of the new system. In this respect, stakeholders' interests are determined by expectations and a set of stakeholders' beliefs on how the IS will serve the group interest.

Values are part of social and cultural aspects that represent personality traits. In practice, it is difficult for individuals to share a common pool of social values. Without a common pool of social values, it would be difficult to establish a framework and tools for assessing IS failure.

In this context, IS failure occurs when the set of shared values have not been achieved, for example, some goals are not achieved or performance is below standard. Groups of people with shared value may be involved in the development of the information systems. These groups of people are called 'stakeholders'.

3.3.2 Definition of a stakeholder

A stakeholder is defined as an individual who has a vested interest in the problem and its solution internally and externally (Masson and Mitroff, 1981). The definition of stakeholder is based on the assumption that there is no general definition of IS failure.

The failure of the system creates problems for someone or some group. It is considered that IS failure signify a misunderstanding between the actual situation and the desired situation for members of a particular stakeholder group.

However, this concept does not explain how stakeholder value comes about. In this context, this research assumes stakeholders' values originate from the interests various stakeholders try to pursue. An interest can sometimes further a stakeholder advantage.

Stakeholder interest (as also found in this study; see Chapter 6 – Section 6.2) is influenced by position in the organisation and thus power based. The more power one holds; the better the bargaining position. In effect, stakeholder groups may attempt to influence decisions, in order to achieve their interests.

Government organisations are generally designed to deliver services to the satisfaction of multiple stakeholders. This is likely to lead to a lack of clarity over goals (Cross, 2002). For instance, large government projects such as ID projects are generally designed to deliver economic, social and political value to a wide variety of stakeholders e.g., citizens, government departments, regulatory agencies, businesses, to name a few.

For these reasons such government projects face specific difficulties, including their high visibility, the risk averse culture of the civil service, the need to meet politically-driven timescales and, in many cases, their enormous scale and complexity (RAE and BCS, 2004).

Researchers emphasise that government IT projects need to deliver value to the stakeholders and that such value needed to be examined considering the links between IT goals, implemented systems, government performance, and public returns (Adelakun and Jennex, 2002). Many governments have been very active in seeking new approaches to justifying and prioritising their IT expenditures and highlighting their performance as a means to build trust and maximise project value.

However, the range and complexity of government IT investments makes assessing their returns a daunting prospect (Cresswell et al., 2006). The returns may be large or small, obvious or obscure, and can run from a few minutes saved in a routine transaction to improving the trust and legitimacy of an entire government. In spite of the difficulty in assessment, however, knowledge about stakeholder returns is considered vital to fully informed and justified IT investment decisions (Cresswell et al., 2006).

Assessing these returns remains a core problem in IT strategic planning and decision making (Singer, 1995). Following are some of the significant issues identified in the literature as shortcomings of current practices to assessing returns and value:

- Incomplete analysis of value, resulting in too narrow scope of what can be considered returns to the stakeholder;
- Lack of systematic attention to how government IT investments generate results of value from the point of view of the stakeholder;
- Weak or absent methods for tailoring a return on investment (ROI) assessment to the specific context and goals of a government IT investment.

Researchers pointed to the fact that government projects need careful analysis and identification of stakeholders and their roles, and the value each one may desire (Gilb, 2005). The term value can be notoriously difficult to define because it tends to be situation dependent.

How value is defined is a matter of perspective from different stakeholders – be they clients, the community, suppliers, or government. For instance, and despite the fact that the LUAS light-rail project in Dublin has exceeded both its budget and schedule, many stakeholders (the travelling public) would probably deem it

to be a success, even though as taxpayers a considerable proportion of their tax contribution went to fund budget overruns (Naughton, 2004).

Indeed, a stakeholder is in a position to view the project outcome from various perceptions and arrive at different conclusions (Elpez and Fink, 2006). These views need to be considered when attempting to obtain a comprehensive view and measuring success (ibid).

But how are stakeholders and their values identified? Identification of an interest or stake is as difficult as to recognise the stakeholders perceptions of shared values. Does everyone that has a stake in some situation get recognised as a stakeholder? Some people may consider themselves to be stakeholders; and others may not think so.

This raises confusion in the concept of the stakeholder's role. There are two theories that support who the stakeholders are. The first is that a stakeholder believes that they may have a stake in the information system (Mason and Mitroff, 1981). In this instance the stakeholder is determined by the actor's beliefs.

On the other hand, Marxists and Weberian philosophies, focusing on the structural appearance of the situation, recognise stakeholder groups regardless of what the actual actors think - according to Marxism, actors in many cases are unaware of their interests, 'false consciousness' (Burris, 1987; Löwith, 1982).

In this case the recognised measures are the structural arrangements of interests shared amongst the stakeholders group. The information system is taken to be an organisational arrangement which maintains basic similarities to other social institutions (Kling and Scacchi, 1982). Accordingly, *the stakeholder groups are those who have influence in the information system*.

However one chooses to view the stakeholder concept, the task is far from being simple. The literature often divides the stakeholders into three groups; users, management and IS professionals.

The main concern is the role description associated with the IS design. It ignores the actor's actual interests in relation to the IS; instead it concentrates on intended and observable aspects, and has often ignored conflicts inside these three groups.

A set of four components are listed in Table 3.5 below to provide a better understanding of the key stakeholder groups. The four sets of components are; nature of IS, types of relationships, depth of impact and level of aggregation (Lyytinnen and Hirschheim, 1987).

Table 3.5: Four components for understanding key stakeholders

Nature of IS	IS may be recognised as a communication tool, decision making tool, and advanced technology etc.
Types of relationship	Stakeholders may be producers, customers, regulators and users etc.
Depth of impact	the effect of the IS on certain users may be direct or indirect.
Level of aggregation	an individuals career prospect or working patterns may be affected as a result of the information system

Using the above criteria for stakeholder analysis should support the: identification of the key stakeholders during the project planning stage, assessment of their interests and the way in which these interests are likely to affect the project (Lyytinnen and Hirschheim, 1987). However, there is no blueprint for stakeholder participation; judgment is needed to determine who should participate and clear understanding of their potential roles and contributions. Figure 3.2 shows a simple model for stakeholder analysis that was adopted in this study (See also Chapter 4- Section 4.2.5).

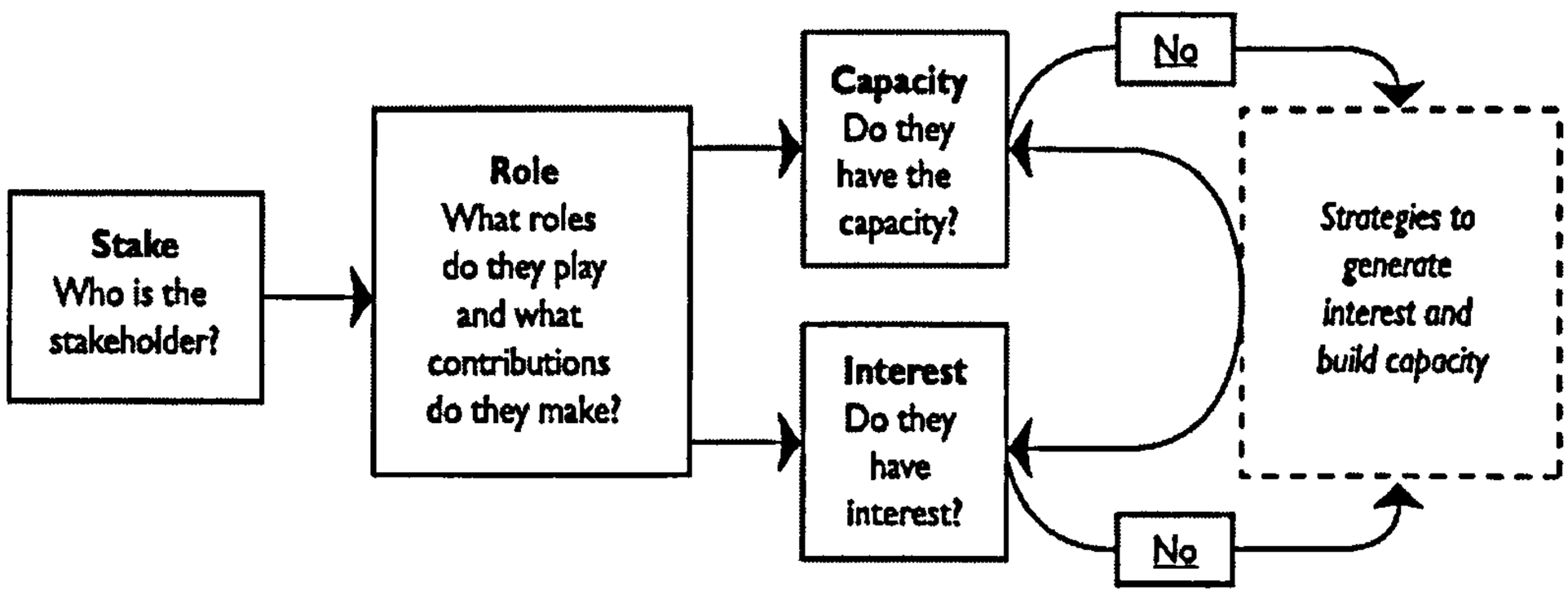


Figure 3.2: Stakeholder Analysis for Participation

Conforming with Seddon's (1997) view, this section attempted to highlight that IS success can be defined as "a measure of the degree to which the person evaluating the system believes that the stakeholder in whose interest the evaluation is being made is better off" (p. 246).

Different individuals are likely to evaluate the consequences of IT projects from various perspectives (Belassi & Tukel, 1996): "IS success is thus conceptualised as a value judgement made by an individual, from the point of some stakeholder" (Seddon, 1997, p.247).

Careful stakeholder analysis and thereafter planned involvement is critical to the success of the project. Determined by the stakeholders' opinions and perceptions, the next section presents a model for measuring the success and failure of IS systems.

3.3.3 Types of information system failures

Lyytinen and Hirschheim (1987) outlined IS failures into four categories; expectation failure (a recent approach) followed by the traditional approaches, correspondence failure, process failure and interaction failure (see also Figure 3.3).

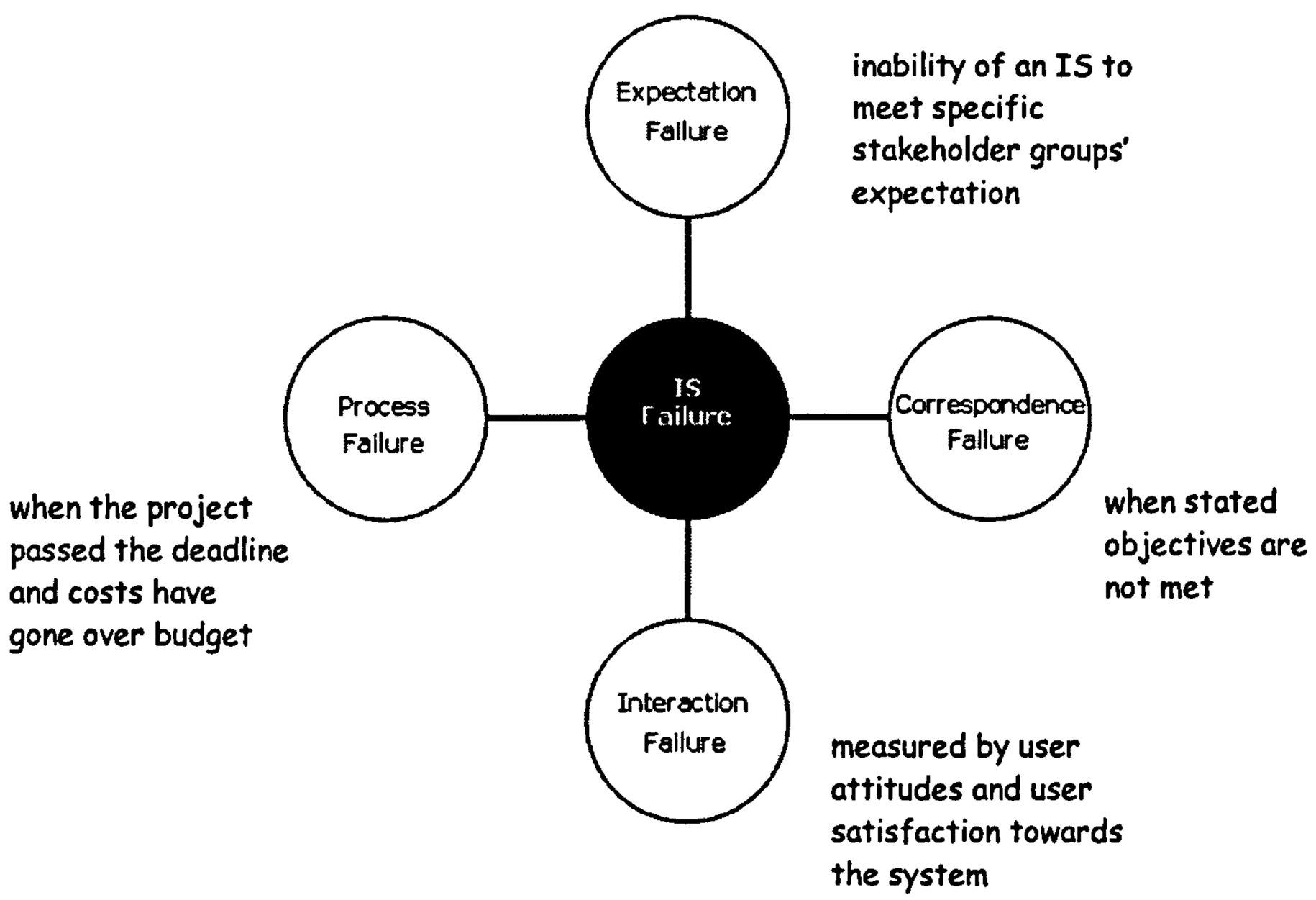


Figure 3.3: Lyytinnen and Hirschheim four failure factors

3.3.3.1 Expectation Failure

Expectation failure may occur when the expectations of stakeholders' interests are not formulated. The expectations represent stakeholders' set of values. In many instances these expectations are vaguely expressed e.g., stakeholders are unable to express their opinions due to for instance organisational conflict or a lack of time.

Some of the expectations correspond with the original IS design, to justify the effort and investment of IS. These are outlined in terms of systems requirements, goals, and design standards. In this respect, IS failure is defined as the 'inability of an IS to meet specific stakeholder groups' expectation' (Lyytinen and Hirschheim, 1987). It is vital to interpret the meaning of expectation failure.

First the definition does not explain how expectation failure is encountered nor how it can be resolved.

Second, the theory does not explain how many people amongst the group are affected by the failure. Depending on the types of interests pursued by the stakeholders, the failure may affect one or many stakeholders, usually in different ways.

Thirdly, expectation failure appears in two forms; structural and process. In the former, structural properties are affected and collide with the stakeholder's interest. In the latter, the level of stakeholders' expectations may be influenced by conflict such as organisational learning, political campaigning etc.

In these circumstances, stakeholders would detect that the information system is inconsistent with their interest. Both forms of expectation failure can affect the stakeholders ability to adjust to the IS. In this sense, IS failure is detected at the same time when stakeholders attempt to take action to recognise their interests.

Fourthly, expectation failure does not explain what one should anticipate from the information system. The concept of expectation failure emphasises the importance of understanding, how different stakeholders perceive an information system. It provides a broad (but vague) interpretation of how failure is detected and how various stakeholders perceive the IS.

3.3.3.2 Correspondence Failure

Correspondence failure has been regarded as the most popular notion of IS failure that emphasises the importance of the management view (Cooper and

Swanson, 1979; Alter and Ginzberg, 1978). One criterion for correspondence failure is when objectives that are outlined in the proposal are not met.

However, many researchers argued that in general management objectives are ambiguous and only express broad outlines for action (March and Olson, 1976).

Furthermore the tools used for measuring benefits and performance such as cost benefit analysis and cost accounting techniques can only be regarded as indicators rather than accurate assessments (Hirschheim and Smithson, 1986).

3.3.3.3 Process Failure

Process failure occurs where a system has exceeded its budget (Turner, 1993; Brooks, 1987; Gladden 1982). This type of failure can be divided into two categories with both relating to an inadequate system.

First, the information system is regarded as a failure when the development team cannot produce a functional system. In this situation, the development team is required to establish where the problem occurs; at the design stage, implementation stage or when configuring the system.

Secondly, project management tools are used as an indicator to measure the success of the IS. A form of process failure is where projects have achieved the deadline but costs have gone over budget. Ultimately a successful system may still result.

The subject of overspending has been criticised and is related the backlog in system application development. When this occurs, the project can be extended for as long as two years (Martin, 1991).

3.3.3.4 Interaction Failure

Interaction failure is mostly used as an indicator for information system success. The common measures are user attitudes (Swanson, 1974; Schewe, 1976; Maish, 1979; King and Rodriguez, 1981) and user satisfaction (Pearson, 1977). If a user has full 'interaction' in the system they tend to be satisfied, thus users attitudes will be positive and enhance tasks performance (Ginzberg 1980).

On the other hand, if the interaction is low then users' attitudes are negative and task performance is negative too. In this respect user interaction is a vital factor for system success.

Existing literature on interaction failure provides inconsistent results (Zmud, 1979; Srinivasan, 1985). Lucas (1985); Keen (1975) found positive correlation. On the other hand, Schewe (1976) found that the relationship to be irrelevant, and Srinivasan (1985) found that the relationship was not always positive. Other studies suggest that systems can be intensely used by users but are not regarded as a success (Kling and Iacono, 1984; Markus, 1983).

Secondly, the notion of interaction failure suggests that the system has to be heavily used and measures the amount of data the system transfers. Some systems have been specifically designed to handle small amounts of data; here it would be wrong to suggest system failure, since this originates with the design decision of the system.

It is also possible to have successful systems which are not used very often. March (1981) found that high user interaction with the system will not necessarily improve task performance, rather stakeholders may use it to maintain or increase their bargaining power inside the organisation. Table 3.6 summarises these four factors and their weaknesses.

Table 3.6: Lyytinnen and Hirschheim four failure factors weaknesses

	Occurrence	Weaknesses
Expectation Failure	When IS does not fulfil stakeholders expectations	• Difficult to assist each groups expectation accurately • Each stakeholders groups expectations may be bias, they will act in their best interest to influence the IS
Correspondence failure	When the IS has failed, even though it has achieved their goals	• The failure notion is supported by management views and gaols are often ambiguous and conflicting
Process failure	When fail to meet the project deadline and the cost exceeded the budget	• The emphasis is place on resource allocation
Interaction failure	When the system is not used, and the users attitude towards the system is negative	• Since all system development functions and features require mandatory usages, the measurement can give bias results

The factors of Lyytinen and Hirschhiem (1987) were used to measure the overall success of the national ID system in the UAE (discussed in Appendix-B). The feedback on these factors from the government officials and experts interviewed was that "they provide good basis on which a project can be evaluated to determine the level of its success or failure."

3.4 The Need for Project Management

The Lyytinen and Hirschhiem's (1987) factors discussed above indicate that project success might happen in some unexpected ways, and, likewise, failure might bring with it some surprising positives. In the case of IT project management, instances of such unexpected outcomes may be deemed "failed successes" (process success but outcome failure) or "successful failures" (process failure but outcome success).

A failed success might be completed on time and under budget, for instance, but fail to appeal to the intended constituency or add value to an organisation. Conversely, a successful failure might cost more than expected and take longer than expected to complete—yet ultimately add value to an organisation (Nelson, 2005).

3.4.1 Surveys and statistics

Going back to the statistics provided earlier in this report about the projects failure and building on the discussion, it was noted in several studies that the reasons behind such failures were primarily attributed to poor project management (Stepanek, 2005). The ESI International survey conducted in 2005, for example, revealed many of the factors identified as the major causes of project failure during the lifecycle of the project (See Figure 3.4).

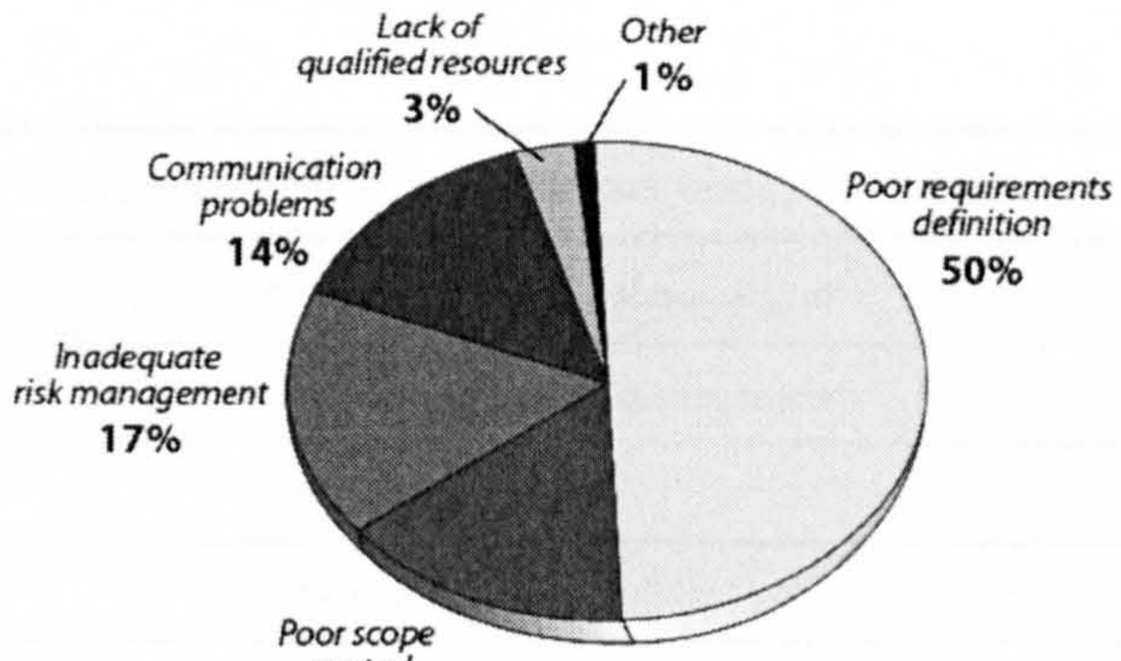


Figure 3.4: Key challenges and major cause of projects failure

Source: ESI International (2007)

Another study carried out by Metagroup (2002) showed that lack of good project management often leads to failed projects. See also Figure 3.5. The most

common reasons for failure referred to project management, project planning and communication.

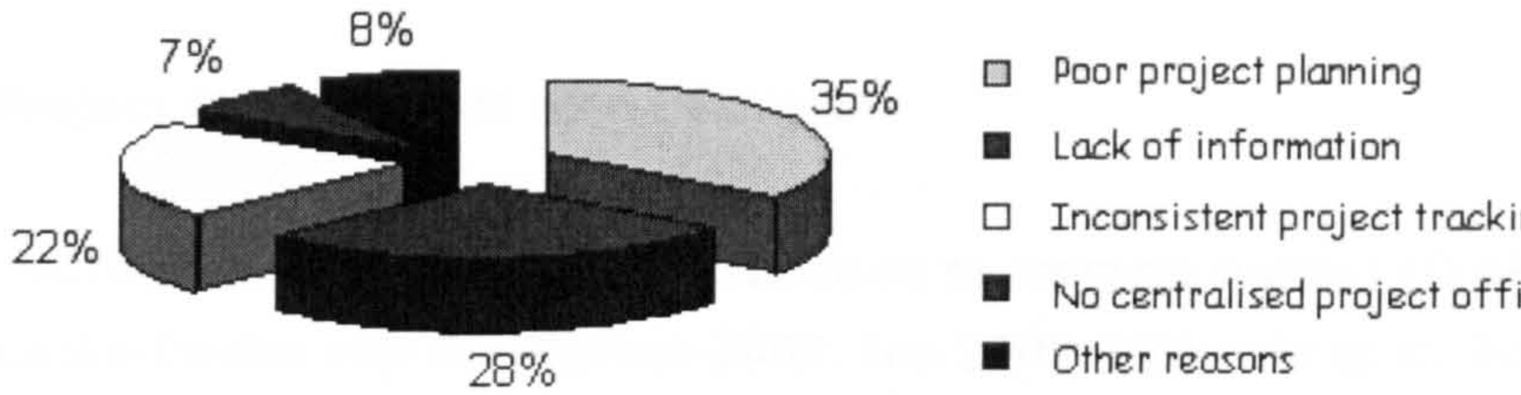


Figure 3.5: Metagroup study results

The same factors were present in many other surveys conducted around this subject area (see for example: Cooke et al., 2001; Robbins-Gioia Survey, 2001, Standish Group, 2003) and also in many of the critical studies and evaluations of IT projects conducted by researchers in the academic field (see for example: Karlsen, 2006; Lemon et al., 2002; Shoniregun, 2004).

A KPMG survey focusing on IT project management issues that covered Canada's leading 1,450 public and private sector organisations revealed that project management was rated as the most important area contributing to project failure in cases with both serious budget and schedule overruns as depicted in Table 3.7 (Whittaker, 1999).

Table 3.7: Factors contributing to serious budget and schedule overruns

Ranking	Area of project management
1	Project execution management
2	The project team
3	Risk management
4	Project accountabilities

Infoweek magazine put it succinctly in their August, 1996 issue: "The major cause of project failure is not the specifics of what went wrong but rather the lack of procedures, methodology, and standards for managing the project." The plight of project managers in most organisations who are asked to manage projects with no methodology, no procedure, no process to support them is that they are

going to be very challenged to keep their projects under control. Crawford (2002) indicates that this is the largest determining factor why projects are failing so miserably across all industries.

3.4.2 Project Management as a Backbone

Project management is viewed in the literature to promote success (Cooke-Davies 2002, Cooke-Davies and Arzymanow 2003, Loo 2002, Milosevic et al. 2001) in all four dimensions of the Lyytinen and Hirschhiem (1987) model. Many academics and practitioners distinguish project management as the art of defining the overall management and control processes for the project (Devaux, 1999; Garton and McCulloch, 2005; Stankard, 2002). As such we define project management methodology as an organisation's approach to control and make decisions on a project during project management.

A number of attempts have been made during the past 50 years to examine and develop frameworks for project management. Attention has shifted from single tools and practices towards holistic and systematic methodologies and frameworks that account for multiple success factors.

Project management methodologies usually represent a collection of good practices and prior knowledge, common agreement or commitment across different stakeholders, and a suitable practice across a majority of projects in the organisation or its unit. They can be more or less systematic, standardised, documented and formal.

To overcome many of the difficulties identified in the literature, project management has progressively adopted relevant elements of other basic management disciplines, including ones that have been more recently developed, notably risk management. In this sense, it is an integrative discipline which brings together other management disciplines in a framework.

These disciplines include finance, cost control, quality management, human resource management with emphasis on management of teams, communication, risk management, procurement and logistics and contract management.

Indeed, a project management methodology that takes into account the success and failure factors in the field of IT projects are more likely to increase the

success probabilities of the project (Avison & Fitzgerald, 1988; Curtis, 1998; Flynn, 1998).

3.4.3 Project Management in Practice

Project management methodologies are in active use today. In a survey study by White and Fortune (2002), 72% of the 240 companies included in the study reported that they use a project management method or methodology. 54% used their own in-house project management method.

There are different types of project management methodologies and frameworks, ranging from standards and bodies of knowledge (Bentley 2001, APM 1996, PMI 2006) and competence baselines (e.g. IPMA 1999) to more focused methodologies (Hartman and Ashrafi 2004, Pillai and Tiwari 1995) and information systems and software (Conroy and Soltan 1997, Metcalfe 1997).

Many organisations rely on project management methodologies that they have developed only for their own use, or modified from publicly available methodologies (White and Fortune 2002). The level of detail and the comprehensiveness of methodologies vary.

In general, *project management* has worked with differing degrees of success, in different industries, different organisations, and on different projects. What is undeniable is that organisations have been much more successful when project management is used than when it was ignored (Devaux, 1999; Ireland, 1991).

3.4.4 The methodology jungle

The literature perceive the field of methodologies as a jungle with a large and confusing variety of approaches in existence and that it is unlikely to change much in the future due to the continuous developments in IT, IS systems and organisations (Avison & Fitzgerald, 1988). It has been estimated that over 1,000 brand name methodologies exist world-wide (Jayaranta, 1994). Many of them combine several models into some sort of hybrid methodology using the methods and techniques identified in other methodologies.

Although such methodologies may differ in their recommended techniques, some are usually based on different 'philosophical' views creating more fundamental differences (*see also* Crain, 1992; Curtis, 1998; Harry, 1997). Key development efforts on the international level on project management standards are:

- PRINCE2 (Projects IN a Controlled Environment)
- Project Management Body of Knowledge (PMBOK)
- ISO 10006:1997, Quality management - Guidelines to quality in project management
- V-Modell (German project management method)
- ISEB Project Management Syllabus

One would assume that the issue of a suitable methodology and/or framework would have received much greater attention and research by the academic community. However, in a review of the current literature[2], there are very few publications that address project management methodologies and frameworks (see for example, Charvat, 2003; Avison & Fitzgerald, 1995), but there is rather more focus on system development methodologies.

Charvat (2003) found in an analysis of eighteen different methodologies (as depicted in Table 3.8) that some focus purely on the technology itself, while others focus more on a generic project management approach and that organisations need to carefully assess the methodology based on the organisational requirements. He also draws attention to the fact that it is the project size and complexity which necessitates the use of what he calls *Light* and *Heavy* methodologies.

Figure 3.6 depicts a selection matrix to guide the type of methodology projects may employ. He further stresses that it is very important to get the selection right for the given organisation and the particular project circumstances, as failure to match these correctly may well result in disaster.

[2] A comprehensive review of the project management literature was provided in submission two.

Table 3.8: Comparison of various methodologies from a project management perspective

Description	Suited to control of: S	Q	T	$	Phases	Project Size	Comments
Project Management Frameworks Methodologies							
Rational Unified Process	Y	Y	Y	Y	Y	M, L	1, 2, 3, 4
PRINCE2	Y	Y	Y	Y	Y	M, L	4
System Development Life Cycle (SDLC)	Y	Y	N	?	Y	S, M, L	3, 4, 6
Solutions-based Project Methodology	Y	Y	N	N	Y	S, M	3, 5
TenStep	Y	Y	Y	N	N	S, M	5
Technology Development Management Methodologies							
The "Agile" Group:							
Extreme Programming (XP)	N	Y	N	N	N	S, M	5
Scrum	N	Y	N	N	N	S, M	5
Crystal	N	Y	N	N	N	S, M	5, 7
Dynamic Sys. Development (DSDM)	Y	Y	Y	?	Y	S, M	5
Rapid Applications Development (RAD)	Y	Y	Y	?	Y	M, L	5
Unicycle	Y	Y	Y	Y	Y	S, M, L	4
Code-and-fix Approach	N	N	N	N	N	S	7
V-methodology	Y	Y	Y	Y	Y	M, L	4
Waterfall	Y	Y	Y	Y	Y	M, L	4, 6
Open Source	N	N	N	N	N	S, M	5
Spiral	Y	Y	N	N	Y	M, L	4
Synchronise and Stabilise	Y	Y	N	N	Y	M, L	
Reverse Engineering Development	Y	Y	N	N	Y	M, L	4
General Publication Methodology	Y	Y	N	?	Y	M	4, 8
Structured System Analysis & Design	Y	Y	N	N	Y	M, L	4
Pramis	Y	Y	Y	Y	Y	M, L	4
Offshore Development	Y	Y	Y	Y	Y	L	4
General Drug Development	N	Y	N	N	Y	L	4
Classic Building Construction	Y	?	Y	Y	Y	M, L	4

Comments:
S = Scope; Q = Quality; T = Time & $ = Cost
1. Y, N, ?: Yes, No, Undetermined
2. S, M, L: Small, Medium or Large projects
3. Arguably an IT/software development methodology, I.e. belongs under Technology Management
4. High management ceremony
5. Low management ceremony
6. Classic "waterfall" sequence
7. Not suited to virtual teams
8. For book and periodical publishing

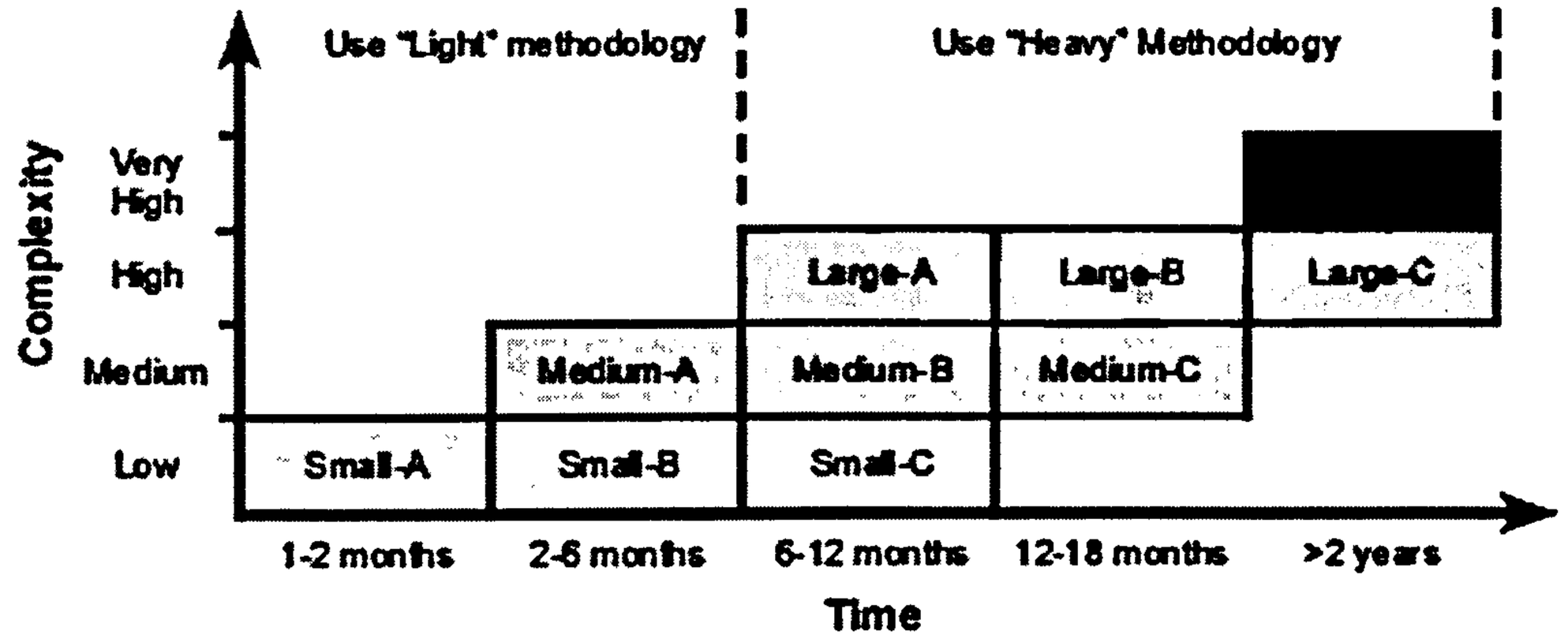


Figure 3.6: Charvat's matrix for selecting light or heavy methodology

Prior to continuing the discussion on the subject, it is important to draw a distinction between development and project management methodologies. There are significant differences between the two. The first is that most of system development methodologies are not as broad as project management methodologies.

Recent research studies found that most IT projects use system development methodologies that focus on the execution phase but rarely involve much of the initiation and planning phases (see for example Table 3.9).

Table 3.9: Deliverables of Planning Phase

System development	Project management
• Work statement • Requirements document • Solution documents • Specifications document • Design schedules • Detail design documents	• Project scope statements • Critical success factors • Work breakthrough structure • Cost benefit analysis • Resource plan • Project schedule • Risk plan • Procurement plan • Quality plan • Communications plan • Configuration budget estimate • Project planning transition checklist

Many system development methodologies entirely ignore the closeout phase, which is considered to be one of the extremely critical stages of any given project. Such methodologies reflect different approaches to completing the product deliverables that address product specific needs.

3.4.5 The need for a new methodology?

Research shows that project management methodologies play a critical role in reducing the risk of project failure if applied appropriately (Hunter, 1997). They show that project teams with formal shared methodology tend to be more efficient, resulting in lower cost, controlled schedule and better able to deal with risks. A more detailed discussion of the value of a project management methodology was provided in submissions one and two.

The literature recognises that no one methodology could be the magic solution for any particular project success, but rather by employing one, an organisation will have a well defined set of concepts to handle each step in the project (Ives & Olson, 1985; Newman & Sabherwal, 1996; Olle et al., 1991). In fact the literature shows that there is still much work to be done to improve the current project management life cycle, in both standards and product (deliverables) management (Charvat, 2003; Wideman, 2002).

The tragic facts provided in the literature about the rate of ICT project failures raises huge concerns for those in the field. The nature and complexity (both social and technological aspects) of the project that was selected to participate in early in this research study provided him with an opportunity for further development and innovation in this field.

The focus of this research study, which is centred around project management methodologies as primary driver for project success, the author developed and tested a new project management methodology to manage a US$200+ million dollar government IT project. The following chapter describes how the new project management methodology was developed and discusses its underlying philosophies and principles including its major components, structure and deliverables. Chapter five will highlight its differences compared to other existing project management standards and Chapter eight will describe how and where it was tested.

Chapter

4

The PROMOTE Project Management Methodology

Summary: *This chapter discusses the various elements that constitute the PROMOTE methodology including the philosophical underpinning, the model, techniques, scope, outputs, practice, product and the goal of the methodology. The author has used Avison and Fitzgerald's (1988) framework to provide a systematic exploration of the key elements. A summary of how the methodology is applied is supplied in appendix-A.*

4.1 PROMOTE Methodology

A two-stage project management methodology, consisting of nine phases, was developed as part of this research study. The methodology is called PROMOTE. (**PRO**ject **M**anagement **O**f **T**echnology **E**ndeavours) and focuses on the effective management of technology driven projects, with particular emphasis on National ID Card type projects. Figure 4.1 shows the methodology flow.

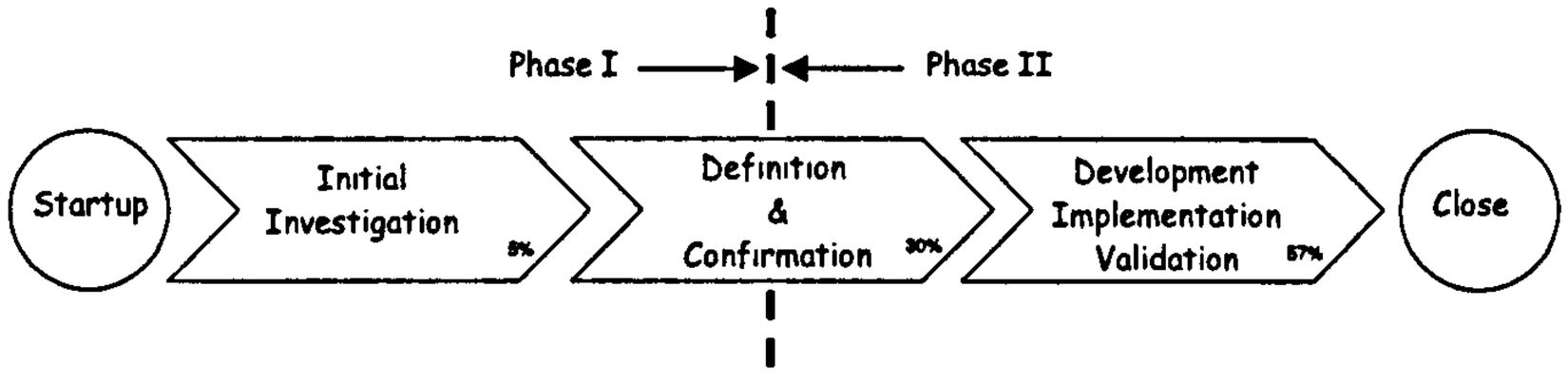


Figure 4.1: PROMOTE methodology flow

PROMOTE was mainly developed in an attempt to guide and support the implementation of large government IT projects which have notoriously high failure rates. The methodology was developed after analysis of the worldwide standards for project management; PMBOK® and Prince2®, and the existing literature on critical factors for succeeding with IT projects.

This was blended with personal experience in the project management and IT projects field, and in particular the UAE ID card and Iris projects plus the feedback from the government officials in case study countries visited, and the feedback from the many conferences presented at or attended during the course of this study.

It is believed that the PROMOTE Methodology advocated is not just another project management methodology for managing IT projects, but there exist fundamental differences between PROMOTE and other approaches (these are discussed in detail in Chapter Five). The goals that underlie PROMOTE are the need to understand and improve the project management of IT projects to ensure success in the light of stakeholders' expectations of quality, time and cost (Adelakun & Jennex, 2002; Elpez and Fink, 2006).

The philosophical basis, structure, and design of the methodology are examined using Avison & Fitzgerald's (1988) framework. This framework is frequently cited and used in the current literature for comparing and developing methodologies (Bielkowicz et al., 2002; O'Donnell et al., 2002).

4.2 Avison & Fitzgerald's Framework

Avison & Fitzgerald (1988) have developed the following framework for comparing methodologies, based on a number of previous attempts by other authors such as Wood-Harper and Fitzgerald (1982). The framework facilitates the conceptual mapping of similarities and differences between different methodologies.

Although their approach resembles a hierarchical structure, the authors describe it as a framework because it takes contextual and philosophical considerations into account. These considerations include academic methodology and taxonomies. The actual evaluation criteria for each element depend on the methodology under consideration. Each element is discussed next.

Their (Avison and Fitzgerald, 1988) seven basic framework elements, with sub-elements, are:

1. **Philosophy**: principle or set of principles that underlie a methodology
    a. Paradigm: (hard) science versus (soft) systems.
    b. Objectives.
    c. Domain.

   d. Target: particular types/sizes of organisations?

2. **Model**: the basis of the methodology's view of the world.
3. **Techniques and tools**: set of integrated techniques, such as Entity-Relationship Modelling and Data Flow Modelling and the use of CASE tools to support the techniques.
4. **Scope**: life cycle, level of detail.
5. **Outputs**: deliverables produced during the phases of the methodology.
6. **Practice**: use of the methodology in terms of the differences between the theory and the practice
   a. Background: academic or practitioner/commercial.
   b. User base: numbers & types of users.
   c. Players: users and/or analyst.
7. **Product**: looks at the nature of the product itself, in terms of documentation, support, training courses, software, telephone/online help, etc.

4.2.1 Philosophy

The philosophy is an important aspect of the methodology and is regarded as a principle, or set of principles that underlie the methodology. It underscores the choice of the areas covered by the methodology, the systems, data or people orientation, the bias or otherwise towards computerisation, and other aspects that are configured on the basis of the philosophy of the methodology.

Many authors have emphasised the importance of the methodology's underlying philosophies and assumptions and that organisations need to be aware that they should match their beliefs to that of the authors of the methodology to achieve the claimed benefits (Burrell and Morgan, 1979; Everitt and Fisher, 1995; Hirschheim, 1985; Searle, 1995; Walsham, 1995). Though the philosophy can be explicit, Avison and Fitzgerald (1988) point out that in most methodologies the philosophy is implicit, as methodology authors seldom stress their philosophy.

They also indicate that the philosophy development is guided through the four factors of (1) paradigm, (2) objectives, (3) domains, and (4) applications, as discussed next.

(1) Paradigm

Paradigm is defined in the Kuhnian sense of a disciplinary matrix that is composed of those (a) shared beliefs, (b) values, (c) models, and (d) demonstrative examples that guide a 'community' of theorists and practitioners (Kuhn, 1970, 1974). Building on Kuhn's definition, Harman (1970) defines a paradigm as "the basic way of perceiving, thinking, valuing, and doing associated with a particular vision of reality..." (p. 5) Capra (1996) defines paradigm as "a constellation of concepts, values, perceptions and practices shared by a community, which forms a particular vision of reality that is the basis of the way a community organises itself" (p. 6).

This leads us to comprehend a paradigm as a specific way of thinking about problems, encompassing a set of achievements which are acknowledged as the foundation of further practice, and is usually regarded as to be applied to a number of problems regardless of their specific content.

Wood-Harper and Fitzgerald (1982) introduced and discussed the two most influential paradigms for systems analysis:

(1) science paradigm: which has characterised most of the hard scientific developments that we see in the latter part of the twentieth century,

(2) systems paradigm: characterised by a holistic approach.

The science paradigm has a long and successful history and is responsible for much of our current world. The systems paradigm has a much shorter and less successful history, but was evolved as a reaction to the reductionism of science and its perceived inability to cope with living systems and those categorised as human activity systems.

Science copes with complexity through reductionism, breaking things down into smaller and smaller part for examination and explanation, simply defending the usefulness of simplification in the light of complexity. This implies that the breakdown does not disrupt the system of which it is a part.

Checkland (1999) argues that human activity systems are different systems which do not display such characteristics, they have emergent properties (that is, the whole is greater than the sum of the parts). He explains that the emergent

properties are meaningless in terms of the parts as they perform differently as a whole or as part of a system than when broken down to their individual components.

This led directly to the development of the systems paradigm which characterised by its concern for the whole picture, the emergent properties, and the inter-relationships between parts of the whole. The system principle implies that we must try to develop application systems for the organisation as a whole rather than for functions in isolation.

The science and systems paradigms are closely related to concepts of hard (systems as they are presumed to exist in nature) and soft (human activity is seen as central) thinking (Bawden, 1995; Checkland, 1999).

The PROMOTE methodology belongs largely to the systems paradigm, as it uses many of the systems concepts. It is regarded as a participative methodology. It is mainly based on the importance of people in an organisation, while appreciating the bigger pictures that also consists of process, and technology. It is the activities that people have to perform that need to be improved in order to succeed with IT projects. PROMOTE is designed to help people achieve this.

The reductionism approach borrowed from the science paradigm is first applied in the logical structure of the PROMOTE methodology design. The PROMOTE methodology is decomposed into two phases (see section 4.2.8 – PROMOTE Design Model). Each of these phases are further decomposed into a series of project phases, with each phase having a predetermined set of project tasks, deliverables and exit criteria.

The reductionism approach is also associated within the methodology activities to decompose the scope into a high-level achievement network of measurable results that become peoples' accountabilities - referred to in the methodology as a work breakdown structure (WBS). With WBS, every team member's assignment is translated in the form of a measurable business outcome.

The resulting WBS is compact so project managers can update it quickly but each entry is supported by a work package that makes project activities clear. Both the project manager and executives have unambiguous checkpoints to measure progress.

Hirschheim and Klein (1989) extend the *paradigm* debate to distinguish between ontology and epistemology. Ontology is 'the science or study of being'. Ontology refers to the claims or assumptions that a particular approach to social enquiry makes about the nature of social reality – claims about what exists, what it looks like, what units make it up and how these units interact with each other (Klein, Hirschheim & Nissen, 1991).

Epistemology is the "theory or science of the method or grounds of knowledge" (Whitehead, 2000). It refers to the claims or assumptions made about the ways in which it is possible to gain knowledge of this reality, whatever it is understood to be; claims about how what exists may be known.

It presents a view and a justification for what can be regarded as knowledge – what can be known, and what criteria such knowledge must satisfy in order to be called knowledge rather than beliefs (Blaikie, 1993).

The PROMOTE methodology subscribes to the epistemology philosophy. Epistemology is the grounds of knowledge. It is concerned with the way in which the world may be legitimately investigated and what may be considered as knowledge and progress. It includes elements dealing with sources of knowledge, structure of knowledge and the limits of what can be known.

The literature further identifies two extreme positions: positivism and interpretivism; a subject that was discussed in detail in chapter two. As explained positivism implies the existence of casual relationships which can be investigated using scientific method whereas interpretivism implies that there is no single truth that can be 'proven' by such investigations.

Taking the interpretivisim stand, the proposed methodology accepts that different views and interpretations are potentially legitimate and the way to progress is not to try and discover the one 'correct' view but to accept the differences and seek to gain insight by the deep understanding of such complexity.

(2) Objectives:

Stated objective(s) is another facet of the methodology philosophy and it also determines the boundaries of the area of concern. Some methodologies state

their objectives to be 'computerisation' whilst others take a wider view and direct their attention to achieving solutions or improvements to the problem area.

This is an important characteristic of PROMOTE as it makes its philosophical objectives very explicit, as the focus of the methodology is on improving the overall project management life cycle activities of IT projects and clearly embodies an assumption that a computerised system is to be constructed.

Considered as a socio-technical approach, the proposed methodology recognises the need to understand wider problems and implications than that specified by the scope of the project or system. The overwhelming objective is to provide improved understanding of stakeholder concerns and to see the problem situation and requirements from their perspective

(3) Domain:

Another factor relating to philosophy is the domain of situations that the methodologies address. This is related to the sub element of objectives above, but focuses on what aspects or domain the methodology seeks to address.

The PROMOTE methodology takes a much wider view of its starting point, and is not looking to solve, at least in the first instance, particular problems. The methodology underpins the logic that in order to ensure successful management of IT projects, it is necessary to analyse the organisation as a whole, define the strategic requirements of the business - to ensure that the project is designed to support these fundamental requirements. This is dealt with extensively in the first phase of the methodology.

Avison and Fitzgerald (1988) distinguishes between methodologies that seek to identify business or organisational need from an information system, that is those which address the general planning, organisation and strategy of information and systems in the organisation, and those concerned with the solving of a specific, pre-identified problem, for example, the need to provide a wider range of marketing information to the sales forces.

PROMOTE is identified as being of planning, organisation and strategy type. It is not a specific problem solving methodology in the sense that it does not assume that a well defined, structured, problem already exists. The development of

information systems is clearly driven by the identified set of high level requirements for the benefit of the business and organisation.

The first stage of the methodology deals with planning and strategising. It attempts to identify the underlying issues that help in the understanding of the problem situation, including the purpose of the organisation. Here an overview is taken of the needs of the organisation in terms of its business objectives and related information needs and an overall information systems plan is devised for the organisation.

The methodology adopts the philosophy that an organisation needs such a plan in order to function effectively, and that the success is related to the identification of information systems that will benefit the organisation and help achieve its strategic objectives. The feasibility assessment results in a list of recommendations for desirable change(s) and action(s) to improve the situation, the results of which can the development of information systems that are managed in the second stage of the methodology.

However, and if looked at in isolation from its first phase, the second phase of the methodology can be classified as specific problem solving methodology, that is, it does not focus on identifying the systems required by the organisation but begins by assuming that a specific problem is to be addressed.

(4) Target:

The fourth aspect of the philosophy deals with the applicability of the methodology. Some methodologies are specially targeted at particular types of problem, environment, or type or size of organisation, whilst others are said to be general purpose.

PROMOTE is argued to be a Hybrid methodology that combines good points from the project methodologies and systems development methodologies to eliminate their weaknesses. The methodology offers a comprehensive approach to managing the overall IT project, where alternative approaches to systems development are envisaged.

The size of the organisation that the methodology addresses is also an important aspect of the target. PROMOTE has been designed primarily for the use in large

government IT projects and is therefore viewed to subscribe to the *Heavy Methodology* classification proposed by Charvat (2003). However, it is viewed to be applicable in the private sector.

Table 4.2 depicts PROMOTE methodology in the context of the proposed matrix by Charvat (2003) for comparing methodologies (See Chapter 3 – Section 3.4.4).

Description	Suited to control of: S	Q	T	$	Phases	Project Size	Comments
Project Management Frameworks & Methodologies							
PROMOTE Methodology	Y	Y	Y	Y	Y	M, L	3, 4

Figure 4.2: Comparison of various methodologies from a project management perspective

Comments:
S = Scope; Q = Quality; T = Time & $ = Cost
1. Y, N, ?: Yes, No, Undetermined
2. S, M, L: Small, Medium or Large projects
3. Arguably an IT/software development methodology, i.e. belongs under Technology Management
4. High management ceremony

Before looking at the proposed methodology components and its inner layout and products, the following sections discuss the theoretical foundations that anchor the proposed methodology, and some of the working principles and assumptions of the methodology.

4.2.2 PROMOTE and its Theoretical Foundations

There are several theoretical foundations that anchor the methodology, including: General Systems Theory, and Measurement Theory.

4.2.2.1 General Systems Theory

General Systems Theory was developed by biologist Ludwig von Bertalanffy in 1936 to guide research in several disciplines as he saw striking parallels among them (von Bertalanffy, 1968). The theory was built on the basis that (1) we must develop a systems thinking to deal with complex systems, and that (2) our ability

to observe, understand and explain our universe will improve as different disciplines focus their research and theory development efforts on identifying laws, principles, and models of reality in system terms.

A systems approach provides a common framework and a scholarly method for the study of societal and organisational patterns and a well-defined vocabulary to maximise communication across disciplines (McNeill and Freiberger, 1993). Systems theory recognises the relativity of perception, which may in itself, serve to expand our understanding of our role in the universe (ibid). It provides a framework for us to examine and understand our environment (Hutchins, 1982). Indeed, systems thinking was an important thread in the emergence of the IS/MIS discipline (Mason, 2005).

4.2.2.2 General Measurement Theory

Measurement is the process by which numbers or symbols are assigned to attributes of entities in the real world in such a way as to describe them according to clearly defined rules (Fenton, 1994). Measurement theory is getting attention from researchers, but is being ignored by practitioners (ibid). A fact that may be related to the high failure rate in IT projects.

Measurement is critical to help the understanding of what is happening throughout the project journey with regards to budget, schedule assessment, effort, cost, schedule prediction, etc. This allows the present situation to be considered and to setup baselines to set goals for future actions. Measurement also assists in the control of the project. By using baselines, goals and understanding of associations it is possible to anticipate what will happen and perform actions to deal with these.

Measurement encourages the improvement of processes and deliverables of a given project. Wolstenholme et al (1990) suggests a breakdown of entities into attributes and further into respective dimensions. The measurement approach used in the PROMOTE methodology combines the above underlined variables and Wolstenholme's approach, to define variables, attributes, their relationships and interactions.

With these theoretical concepts underpinning the methodology this aided the positioning of methodology phases in their contextual setting. Van Maanen (1983) asserts that one may not describe the observed behaviour of a

phenomenon until they have developed a description of the context in which the behaviour takes place and have attempted to see the behaviour from the position of the problem owner.

The theories that anchor the methodology conceptualised in this section served as a core foundation to stimulate and organise the research efforts in this study and the development of the PROMOTE methodology. The domains of these philosophical and theoretical characteristics in the applicability of the PROMOTE methodology (as a project management approach for large government IT projects) is described at an overview level in the following sections.

4.2.3 Key principles of PROMOTE

The following key principles underpin the PROMOTE methodology:

- Projects are based on business need, and focus on specific business objectives.
- All projects are defined by a project charter. This key project management deliverable defines the specific objectives, scope, baselines, deliverables, approach and ground rules for the project.
- Outputs (deliverables, work products, and components) are the basis for defining work, measuring quality, and tracking progress.
- Project priorities and investment decisions are managed through the use of master project plans.
- Each project can identify one or more successive projects that build upon and refine its work.
- Each successive project systematically moves the development effort toward a new or improved business process or supporting application system.
- Estimates can be made at various levels, but are always based on heuristics associated with elements that are known or can be predicted easily, such as knowledge base objects.
- Resource productivity is maximised through the use of common methods, tools and techniques, and the reuse of knowledge gained from previous projects.

- A project cannot exist without management as its base. Aspects of project management can be planned and estimated; however, it is also an ongoing process that must manage and control the unplanned events of the project.

4.2.4 PROMOTE and the role of the Project Manager

As the heart of the methodology, the project manager acts as a leader and process manager. As a leader, the project manager is responsible for managing and communicating a clear vision of the project's objectives, and motivating the project team to achieve them. As a process manager, the project manager must ensure that the appropriate timing, resources, and sequencing of work efforts are applied to create the project deliverables within a given time frame and budget.

Unfortunately, many think a project manager does not require a technical background but needs only the authority to assign and approve project activities that will be carried out by the technical staff. This is an oversimplification and, in extreme cases, can lead to the blind leading the disillusioned.

Project managers cannot lead effectively unless they have some credibility with their project team and the project sponsor. This means that the project manager must have some basic technical knowledge of how the project deliverables will be created, and how they will satisfy the project objectives and of the technology to be used.

Project objectives are rarely static. Over the life of the project, objectives and deliverables may change as new information is gathered by the project team and evaluated by the project sponsor.

The project manager must manage these inevitable changes with well defined scope management procedures, provide continuous leadership for the development team, manage the project sponsor relationship effectively, and create a project environment that allows all participants to maintain peak performance. Further discussion on the criticality of the role of the project manager is provided in Chapter Six where the author reflects and considers the critical success factors identified by the action research study undertaken.

4.2.5 PROMOTE and Stakeholders Satisfaction

One of the principle causes of information system failure is when the designed system fails to capture the business requirements or improve the organisational performance.

Researchers argue that such failures are because many organisations tend to use rule-of-thumb and rely on previous experiences rather than following a methodological approach (Avison & Fitzgerald, 1988). Figure 4.3 below illustrates a classic example of how a user's requirements might be interpreted, not only at the requirements analysis stage but throughout the project.

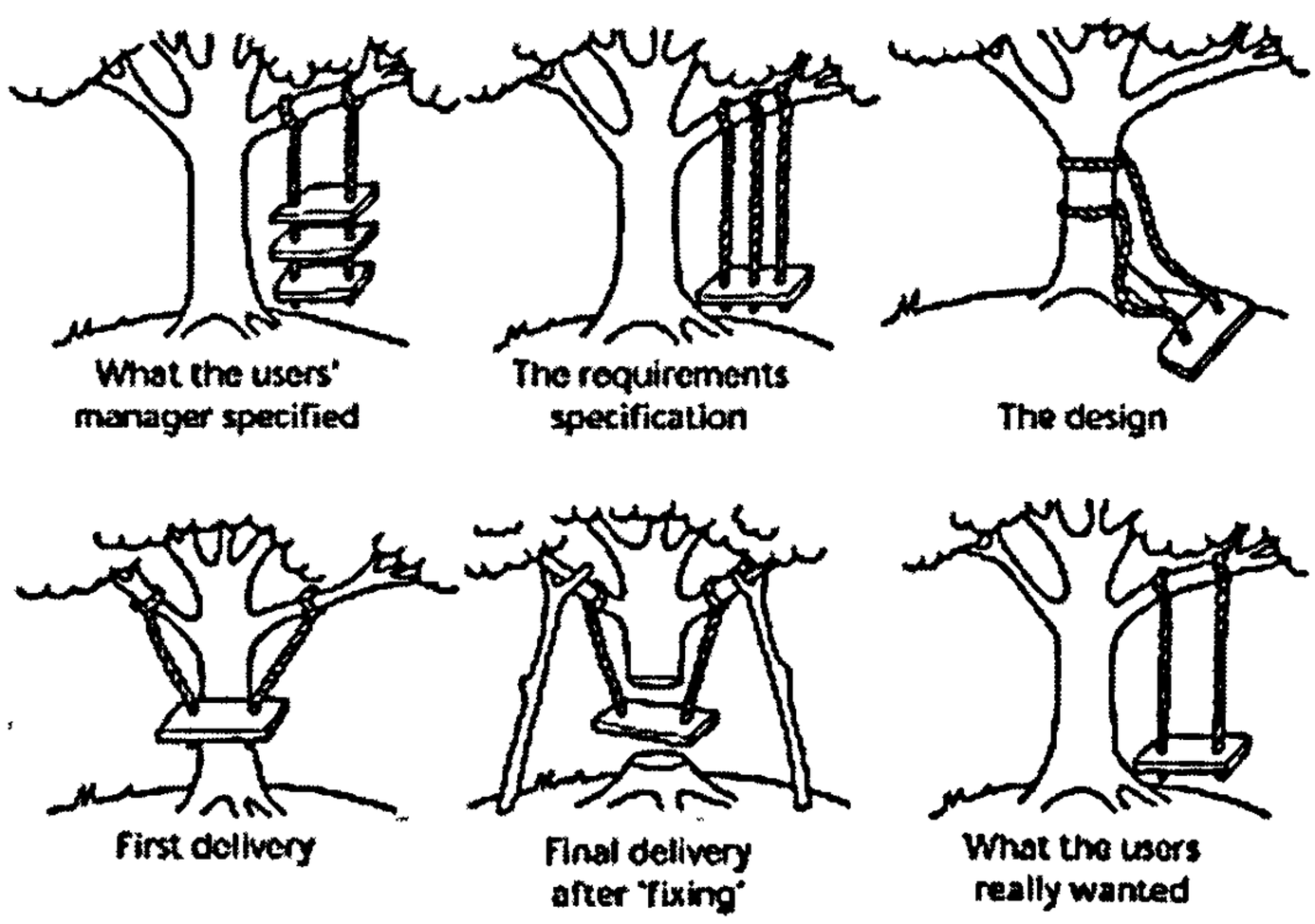


Figure 4.3: Varying interpretations of a user's requirements at different stages in a project.

Source: Bocij et al., (2003)

The PROMOTE methodology employs a structured approach to fill the gaps in understanding the business requirements and the development of the desired system (Avison & Fitzgerald, 1988; Crain, 1992; Curtis, 1998; Harry, 1997; Olle et al., 1991).

It also stresses the application of iterative, feedback-driven and people-centred processes. The systematic development of a requirement in PROMOTE methodology involves seeking the views of stakeholders who will be affected by it, including those who will have to meet the requirement.

In the PROMOTE methodology stakeholders are examined in terms of their roles, degree of support for the initiative, influence over decisions or resources, or the ways in which the project will affect them in both positive and negative ways (Scholl, 2001).

Stakeholder analysis is an essential element in the PROMOTE methodology for developing an engagement plan. Figure 4.4 shows stakeholders importance and influence plotted. These variables might be plotting the level of 'stake' in the outcomes of the project against 'resources' of the stakeholder. Another is the 'importance' of the stakeholder against the 'influence' of the stakeholder. The concept is the same, though the emphasis may slightly differ.

Influence of stakeholder	Importance of stakeholder	
Significant influence	high influence and can affect project outcomes, interests are not necessarily aligned with the overall goals of the project A Action: careful monitoring and management.	high degree of influence on the project, who are also of high importance for its success B Action: good working relationships with these stakeholders, to ensure an effective coalition of support for the project
Somewhat influence		
Little/No influence	low influence on, or importance to the project objectives C Action: limited monitoring or evaluation, but are of low priority.	high importance to the success of the project, but with low influence D Action: special initiatives if their interests are to be protected
Unknown		

Figure 4.4: Stakeholder identification/level of influence framework

Stakeholder metrics are used to ensure that projects focus better on the critical requirements, and that projects are better able to measure their achievements, and to adapt to feedback.

Once the requirements, derived from the project's understanding of the stakeholder needs, and are clearly articulated, the methodology prompts to go

back to the key stakeholders and check that they agree with the project management team interpretation. Working closely with the stakeholder to understand and analyse requirements, an actionable plan is developed which provides numerous opportunities for feedback.

Considering the complexity of any modern information technology system construction or acquisition process, there is a need for a wide range of presentation formats in order to effectively communicate with the stakeholders, participants, and providers. The PROMOTE methodology seeks to employ different tools and techniques to provide different views of the same process for different audiences.

The methodology assumes that the goal of the project is to produce a set of deliverables that all together need to meet the needs of the project stakeholders. The goal of the methodology is not to produce extraneous documentation, management artefacts, or even models of these artefacts.

The PROMOTE methodology deliverables are considered as guiding documents and a vehicle to reach to the final goal and objective of the project. Any activity that does not directly contribute to the goal of producing a working system should be examined i.e., performing only those tasks that add value to business processes supported by the system.

The effort needed to maintain these artifacts must be balanced with their value. Not only must the effort be considered, but the risk that the artefact will create confusion over time if it is not properly maintained must be considered.

In order to further improve understanding of the stakeholders' perspectives, in this study several modifications have been made to the PROMOTE methodology based on the recommendations of Chang (2006):

- use of a range of criteria against which participants are required to judge issues;
- use of synthesising procedures for summarising a set of major issues;
- use of various feedback procedures for respondent group responses;
- use of subpopulations of respondents rather than a single population.

Further information on requirements elicitation and validation of requirements in PROMOTE is provided in section 4.2.8.2 - Stage 8: Requirements Validation & Development.

4.2.6 PROMOTE and the Danger Zone: People, Process and Technology

In addition, and during the methodology development process, it was also recognised that no methodology would produce positive results, if the project is not structured to support the technology. It is recognised that the only way to take full advantage of technology solutions is by resolving and getting the right balance of people, technology and process elements throughout the course of the project implementation.

The fact that it is the perception of stakeholders (discussed in section 4.2.5 above) which determine the success or failure of projects, the balance is more towards involvement of 'People' aptly supported by process and technology.

The influence of people on projects cannot be too strongly emphasised. People initiate projects, people use the facilities and services provided by projects, people oppose projects, and people manage and execute projects.

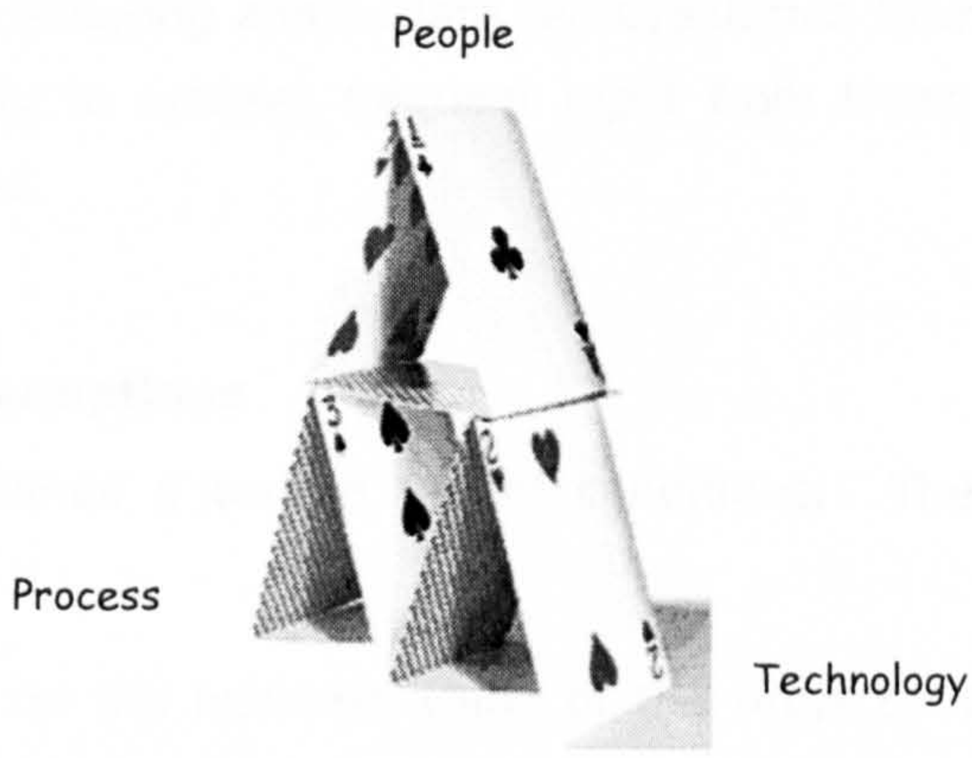


Figure 4.5: Misalignment danger zone

People are all those who have a stake in the project (sponsor, project management teams, users, and other stakeholders). Technology enables the desired solution that the project aims to develop. The Process is the element that builds the bridge between people and technology.

It defines who does what to whom and when. It is comprehended as the transformation sequence that achieves the project goal by using technology and people.

In this context, the process is seen as the application of the methodology and its stages to bridge the people and technology elements. It is recognised to provide a powerful mechanism for engaging stakeholders throughout the project duration

and drive out a shared understanding of project phases and what each phase includes.

The proposed methodology in this study places high importance to people (stakeholders) involvement and views it as a core component for the institutionalisation of good project management practices to be achieved in the most effective and efficient manner. Once the discipline of project management is driven deep into the culture of organisation, project management tools are the means to achieve the end.

The methodology emphasises that at least three constituencies need to be represented in the project team: the business itself, those implementing the solution (IT often being at the forefront) and the end-users. A disconnect between any of these groups is likely to threaten the success of the project (BCS, 2007).

While the omission of end-users is one of the more obvious issues to address, more challenging is ensuring appropriate representation from the wider business. The goal is certainly to achieve frequent input from those who have the best grasp of the business.

4.2.7 Working assumptions

PROMOTE also assumes a certain set of conditions. These assumptions are identified below.

- Focusing on the business value of the project. Project management teams need to start with business goals and objectives and demonstrate how the project will help the organisation meet them.
- Establishing a sound baseline for the planning process. Structuring should set the stage for scope and expectation management, as well as provide enough detail for the project sponsor to make an informed go/no go decision.
- Sponsor Involvement. Project sponsor(s) involvement and support is necessary during the approval process and through out the project. He or she need to be involved early and often.
- A project plan is more than a chart. The planning process should also identify the procedures for identifying and resolving issues and change requests, managing risk, training the team, and conducting knowledge coordination activities.

- Building a manageable work plan. The work plan should contain only the level of detail required to control the project. It may be necessary during the planning process to develop a very detailed plan in order to better understand the project, but this detail should be rolled back up to a controllable level before the project begins. The work plan should contain only the work necessary to produce the deliverables. If the plan is too detailed, then it is likely that the project manager will find himself controlling the plan rather than the project.
- Change is inevitable. The project management process is creative, and will naturally bring about some change. The project manager's job is to recognise the inherent discovery process in the project and control the change – not stop it.
- Setting a tolerance level. Attempting to formally manage small changes can overwhelm the project manager and annoy user management. The project management team must determine the amount of change they can safely accept without formal user approval, and invoke the formal change management process only for changes that fall outside this boundary.
- Managing expectation as well as scope. To assess and manage change requires the project manager to be sensitive to the people dimension of the project. Managing the perceptions of team members and the user community is just as important as managing scope. However, to meet objectives and stakeholder expectation, project management must be aligned with the organisation's culture and integrated with change management and accepted by top management and at all levels of the organisation.
- Controlling the outcomes more than the process. Team members must be allowed to alter the process based on their experience and ideas. Process improvement ideas frequently come from those who actually perform the process. The project manager or the project management office must strive for strategic control of how the methodology is applied but grant the project leaders the tactical freedom.
- Use of exception reporting. Exception reporting allows team members to report only when the information varies from what is expected. This method can save time and in certain situations can provide all the information necessary to control the project.

- The post implementation evaluation. Performing post implementation evaluation is a major step in the continuous process improvement of the project management processes. It is important to document lessons learned and best practices from each project in order to apply these lessons and practices in future projects.

4.2.8 PROMOTE Design Model

The methodology components proposed by Turbit (2004) were used initially as a checklist to ensure that PROMOTE addresses all known issues. The relevance of these items was checked through conducting a short review against other methodologies and frameworks. They were found to exist in all with variations in the level of attention given to each component. Table 4.1 depicts those components.

Table 4.1: Methodology components

Component	Description	Checklist
Breakdown	How is the overall project broken down into smaller components such as phases	See Figures 4.7 and 4.8
Overview	What is the purpose, objectives, deliverables	Sections 4.2.1 and 4.2.11
Activities	What are the main activities	Sections 4.2.8.1/2
Inputs and Outputs	What are the inputs or prerequisites for each activity? What are the outputs or deliverable of each activity	Sections 4.2.8.1/2 & 4.2.11
Instructions	How do you carry out each activity	Case study (see Appendix-A)
Participants	Who should be involved in each activity	Authority Matrix – submission 2
Supporting materials	Tools, checklists, templates and other material that can assist the activity	Provided in submission 2 - See also Section 4.2.9
QA	How do you manage quality at either the phase or activity level	Sections 4.2.11 submission 2 & 4
Timing	How to estimate the time for each activity	WBS – submission 2
Governance	What authority is applicable? This may include approvals, gates to be passed, mandatory activities and sign-offs.	Authority Matrix submission 2

Avison & Fitzgerald's (1988) framework, provides a systematic basis for validating the PROMOTE methodology. The framework provided academic rigor and thus a systematic approach to examine its philosophical underpinnings and resulting structures.

Figure 4.6 provides a high level overview of the methodology components. A more detailed overview of the components is provided in Figures 4.7 and 4.8.

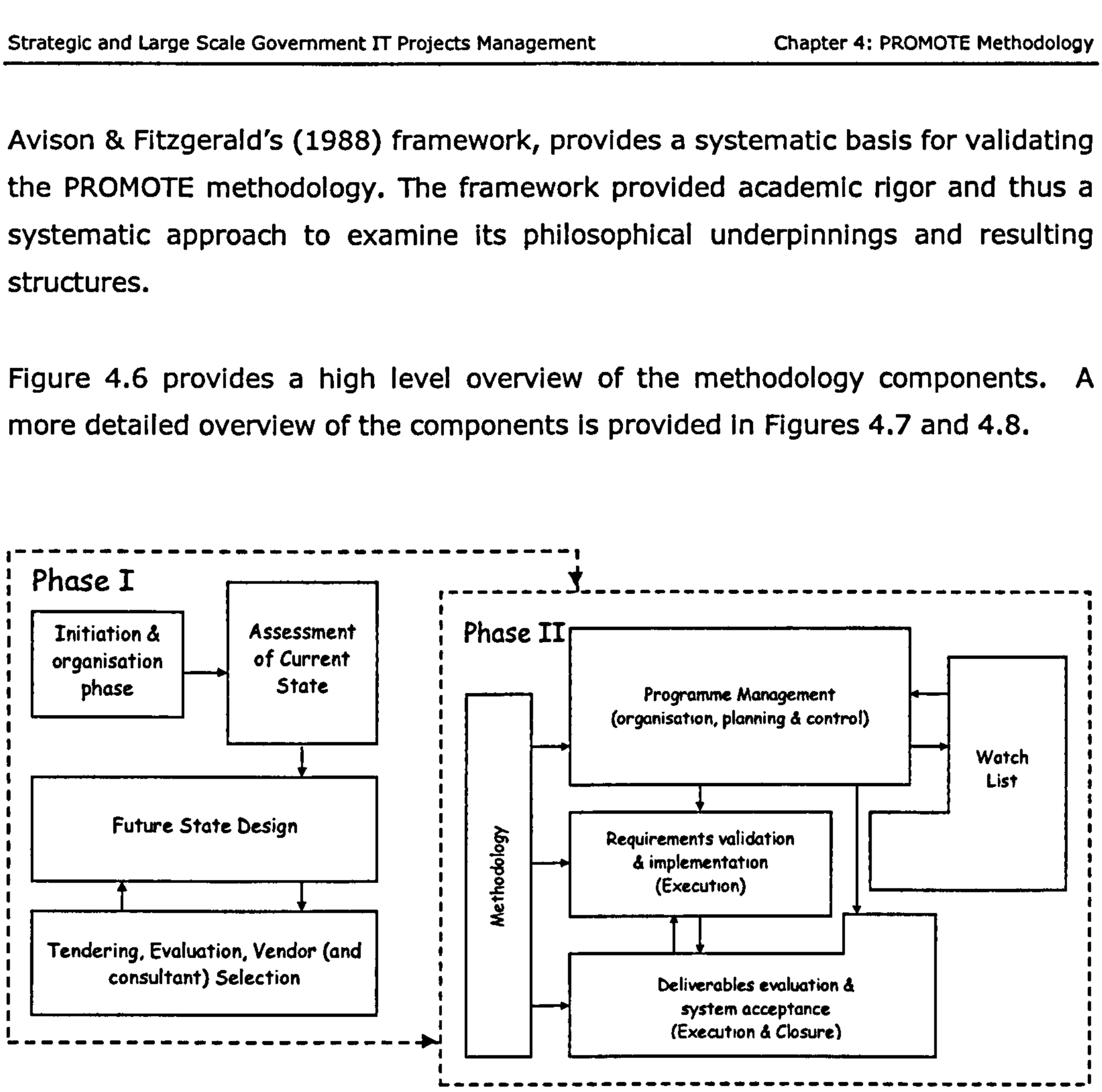


Figure 4.6: PROMOTE Methodology

There follows an overview of each stage of the methodology. A detailed description of its application is provided in Appendix-A.

4.2.8.1 PROMOTE Phases: Phase One

The first phase of the methodology consists of four stages. The aim of this phase is concerned with requirements analysis, feasibility study, systems specifications development, tendering and evaluation, and vendor selection.

Stage 1: Initiation and organisation:

This is the first Project Phase and is usually embodies the conceptualisation of the project. A formal process of forming a steering committee and appointing a consultancy company to provide assistance from technical and operational perspectives is addressed by the methodology.

This first stage also involves the development of strategic objectives including the vision and mission statements that are used in later stages for measurement and evaluation purposes.

Stage 2: Current state assessment:

This phase is concerned with understanding of the existing organisation, its operation, and the situation that is causing the problem and or examining the proposed system and its anticipated contribution to the solution of the problem (Turban et al., 2004). It involves several analysis methods such as observation, review of documents, interviews, and performance measurement (ibid).

An important objectives of the current state assessment is to identify the strategic gap between the present state and the future vision (Bocij et al., 2003), which should form the initial input for the next phase; future state design.

Stage 3: Future state design:

This stage encompasses conducting appropriate technical workshops to record the future state design (FSD) in respect of the proposed solution and its components. The outcome of this stage is expected to yield a description of the future state business processes, organisation structure and technology

components, which should become the input for defining requirements for systems and necessary automation in the next phase.

The developed FSD should satisfy the future state vision developed during the Current State Analysis, and must be the approved design mandate given by the sponsor to the project team to continue to the next phase; the development of the RFP (Request for Proposal). The FSD report should lay down the critical success factors that should be considered prior to or during implementation.

A business case is an important deliverable of this phase, as it can be used to garner funding, provide justification for the required investment, and also provide the bridge between the initial plan and its execution. The need for the system should be justified in ways that relate directly to the organisation's business needs.

Studies argue that one reason for the collapse of the dot-com bubble and the high IT project failure rate is because of the improper business cases submitted to investors and organisations (Turban et al., 2004). Therefore, its purpose is not only to get approval and funding, but also to provide the foundation for tactical decision making and technology risk management (Reifer, 2001).

Stage 4: Tendering and selection (vendor and/or consulting company):

This final component of phase one is more about 'how' to reach the desired state. Due to the huge complexity of large government IT projects especially from the technical perspective, governments may find it extremely challenging to use in-house resources for such developments.

In fact, all national ID projects implemented worldwide so far have been tendered to third parties. All governments included in this study outsourced the development of such systems.

The Current State Assessment and the Future State Design would serve as the basis for drafting the tender (RFP) document. The methodology offers different methods for comparing the received proposals and in following a structured decision making process for vendor selection.

The evaluation process and selection criteria recommended in the methodology favours the benchmarking approach. Benchmarking is perceived to be a very effective method to understanding the current practices in other governments who have already implemented such systems though on a smaller scale.

4.2.8.2 PROMOTE Phases: Phase Two

This phase consists of five stages. It includes all project management activities from organisation, planning, controlling and final closure of the project. It also includes critical elements related to requirements validation, deliverable reviews and system acceptance.

Stage 5: Programme management (organisation, planning and control):

This stage is considered as the main component of phase two. The very early steps in this stage involve the forming of the following:

- Steering Committee: critical decisions are referred to this committee. It is the responsibility of this committee to make resources and information available to the project, and to resolve issues and to approve major changes;

- Operational/Technical Committee: performing the day to day project activities – consist of the project manager and the team leaders;

- Change Control Board: was sit to evaluate the change requests for applicability and the impact to the project.

Another step was introduced later in the methodology, based on project requirements and feedback from both the UAE and GCC countries that required forming a Conflict Management Committee. Its importance was very obvious in this research study in resolving conflicts, improving the teams working relationship, and contributed to the overall quality of the project results. A loss of trust and a failure to communicate result from a failure to stress the joint ownership of problems that will inevitably occur.

This stage also places high importance to the establishment of a project management office to centralise accountability for project management (e.g., (planning, organising and coordinating, leading, supervising, monitoring and

controlling the project). The office is seen to play a key role in promoting the application and deployment of the proposed project management methodology.

Two more important activities performed in this stage are related to the drafting of project charter and project schedule. The project charter document defines the scope of the project, completion criteria, required project management and control structure (e.g., issues management, quality management, scope management, risks management, etc.).

The project schedule is an integral part of the project charter and aims to obtain the commitment from all stakeholders. It is used to communicate final deadlines, and in some cases, to determine resource needs.

Both of these documents underpin a strategy for dealing with project monitoring and controlling requirements. By strategy we mean a plan of actions designed to achieve a particular goal. The PROMOTE methodology uses (but is not limited to) the following strategy – the underlined text refers to how the methodology addresses the issues:

- What impediments to success will we encounter and how will we overcome them? Risk Management Plan
- How will we recognise that progress is being made? Performance Management
- How will we confirm that sufficient quality is provided to accept the results of the project? Quality Management

Stage 6: Watch List:

This stage was introduced at a late stage in the UAE project again based on project requirements and discussion with experts in the filed. It was found that project members started loosing sight of some important aspects in the project especially as they started getting much more workload with technically complex deliverables from the vendor.

The introduction of the watch list stage provided the project team with the opportunity to keep track of the main project areas and the critical success

factors for the overall programme. This step was implemented in the form of regular meetings (every one/two months) with almost all project members to go over the project vision and goals, defined scope, business context and project objectives. This was an open forum for people to put their business and technical concerns on the table.

These meetings sometimes included individuals from the client company and other national and international organisations who were invited to present their own experiences of running and managing similar projects. The stories and the different case studies provided the project teams with different perspectives to deal with the day to day activities and the pressure and challenges they faced.

In addition, this stage deals with providing team leaders a short (3-to-4 days) trainings courses on project management. It was found that even for experienced project managers such courses refreshed their understanding of how business initiatives are planned, managed and evaluated.

Skills gained in these courses included building trust, empowering others, providing feedback, and managing conflicts. These training courses also involved introduction to many of the project management tools and techniques such as those described later in section 4.2.9, which provided them with different models of thinking and solving the issues they face in the project.

Stage 7: Project Methodology

This stage involves revision of the PROMOTE methodology to determine its fitness with the system development methodology and any other possible vendor constraints. It also attempts to align the vendor deliverables with the overall project plan. At this stage, the PROMOTE methodology can be enriched to consider best practices and improved templates.

Stage 8: Requirements Validation & Development

Requirements validation is performed to ensure that the system meets the infrastructure and business requirements of the client organisation. Research studies show that requirement errors are the number one cause of software project failure (Leffingwell, 2003; Schwaber et al., 2006). The PROMOTE methodology lifecycle consists of several important, yet different processes:

- **Elicitation:** gathering requirements (Stage 2),
- **Specification and Analysis:** putting requirements into a formal model or document, such as a use case, and inviting stakeholder feedback (Stage 3)
- **Validation:** making sure everyone understands and agrees on the requirements put forth, and that they are realistic and precise (Stage 8).

The validation stage attempts to ascertain answers to following three questions:

- Is the set of requirements consistent?
- Can a practical system be built that satisfies all of the requirements?
- Is it possible to prove that the system satisfies the requirements?

The validation stage is an ongoing and integral part of the methodology based on its core belief that development today needs to be iterative. The methodology assumes that requirements will change as the project moves through development, for at least two reasons:

(1) the process of doing iterative development allows us to learn about the system as we build it, thereby refining our notion of what the requirements should have been; and,

(2) the outside world is concurrently changing, imposing adjustments that can not be ignored. Thus, a continuous and cumulative cycle of ongoing requirements validation is critical to maintaining quality.

The methodology places high importance to addressing communication issues at this stage, as well as the involvement of all stakeholders' in the process, together with the application of consistent, reliable best practices for validation.

The PROMOTE Methodology advocates the use of quality frameworks (ISO 9126 Quality Model) to assist in requirements validation and to act as

analytical tool to achieve a more thorough view of the system's strengths and weaknesses than will be provided by less systematic approaches.

Stage 9: Evaluation of deliverables and system acceptance (execution and closure)

This stage deals with the installation, operational assessment and acceptance of the project deliverables. The methodology proposes various levels of testing to be performed by the project team and end users, which should determine the acceptance or rejection of each deliverable.

There main review types are followed in the methodology to ensure deliverable quality: (1) Team review, (2) Formal review, and (3) Management review and approval.

Structured walkthroughs were used to test major project deliverables. The methodology offers structured templates designed to guide the review groups in realising the benefits of the walkthroughs.

Upon the completion and acceptance of all project deliverables, this stage brings the project to a controlled end. Assigned Project managers from client and vendor companies work together (with key stakeholders) and agree the procedures to close down the project.

Agreements and obligations, with regards to system support, newer versions of the systems, open issues and disclaimers are documented and signed off by all parties (e.g., client organisation, vendor, consulting company, etc.).

Figures 4.7 and 4.8 provide a diagrammatic overview of the components of the PROMOTE methodology.

Figure 4.7: Stage one of PROMOTE Methodology

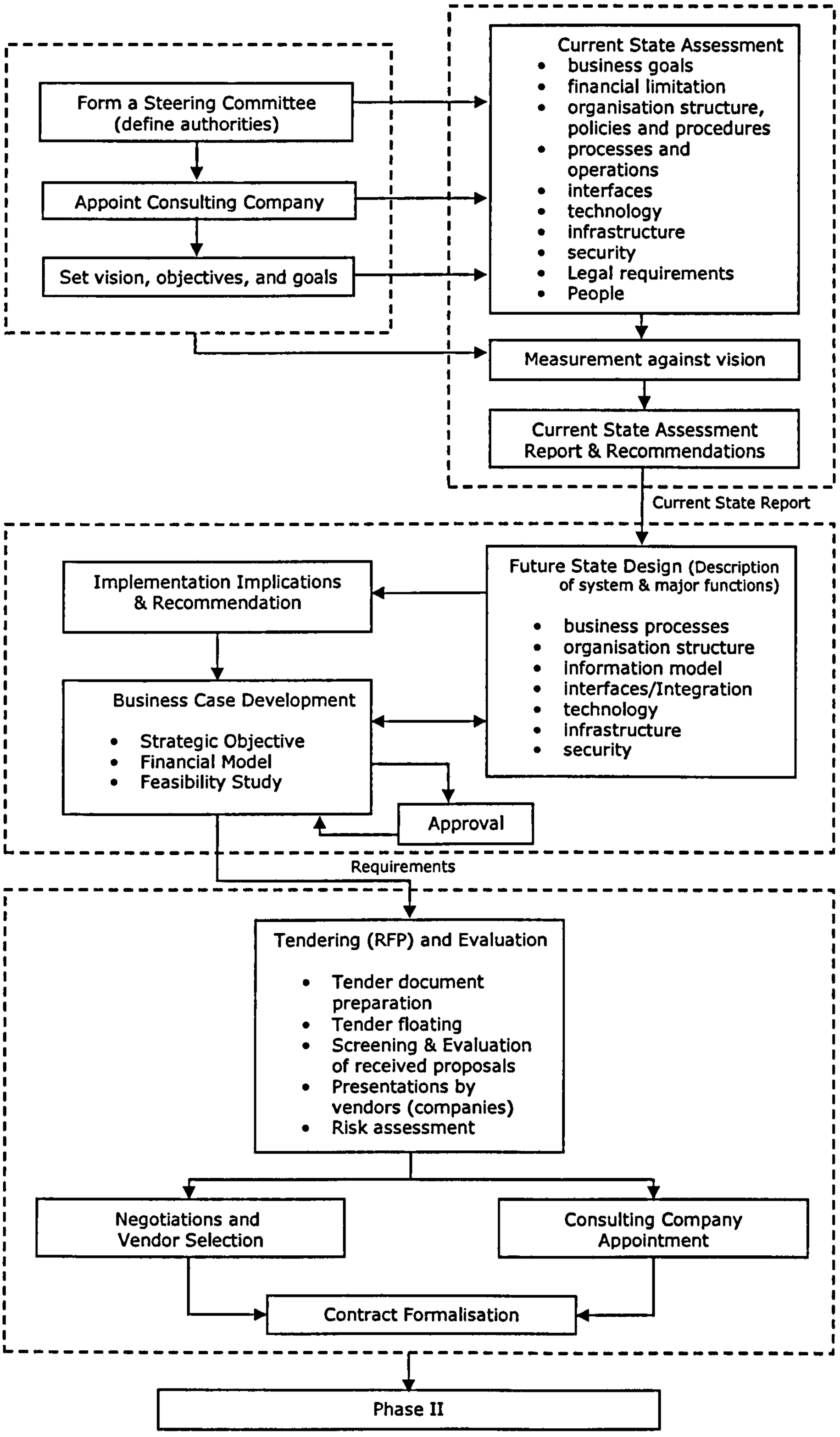
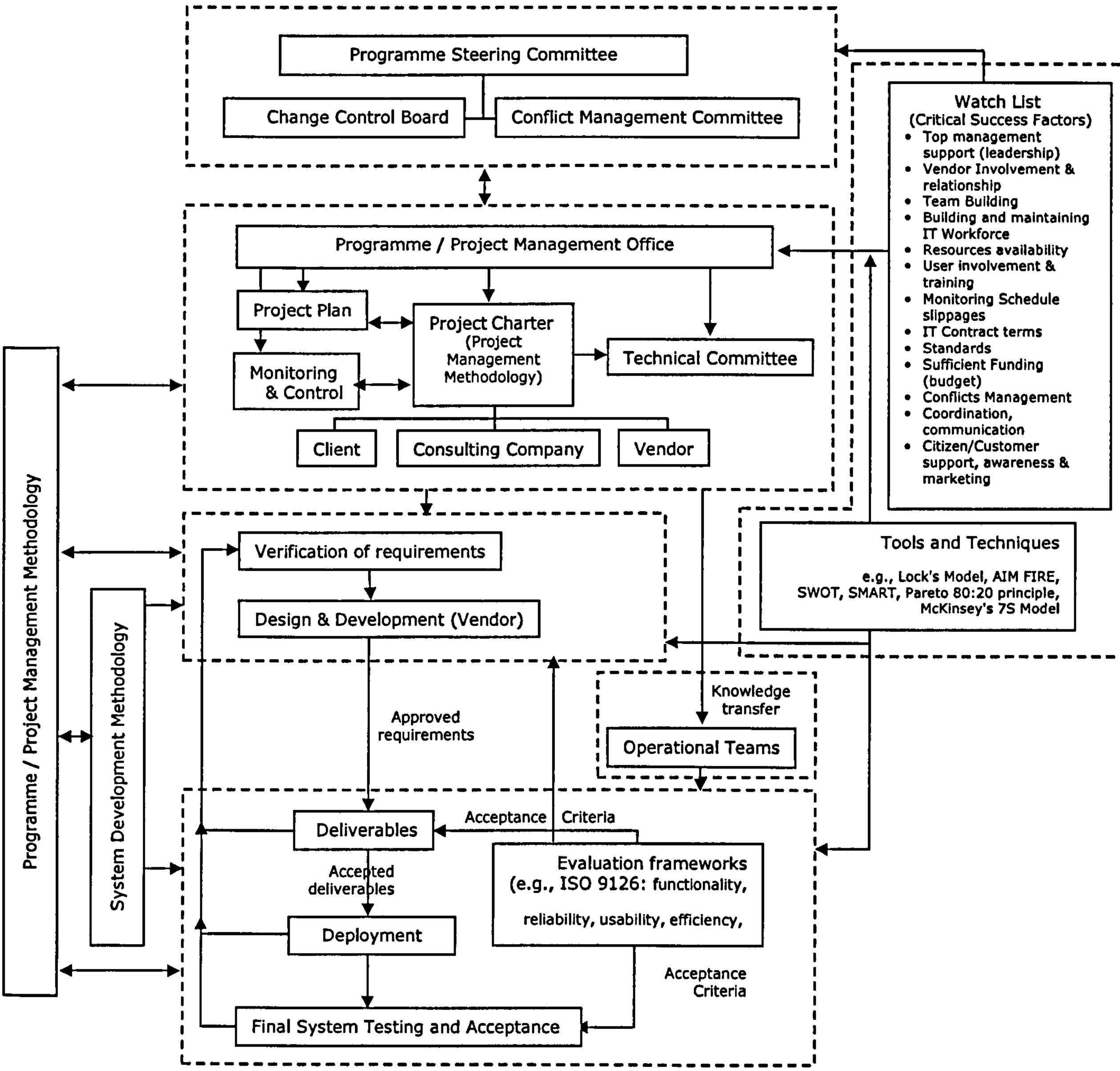


Figure 4.8: Stage two of PROMOTE Methodology



4.2.8.3 Why a two phased methodology?

It was widely quoted in the literature that projects and especially in the IT industry tend to fail due to failings at the beginning and not at the end (BCS, 2007). This is due to insufficient planning and concept formulation (see for example: Charette, 1995; Devaux, 1999; Grindley, 1995).

Researchers argue that project management needs to give careful attention to details at the beginning such as the resource needs, required skills, quality of people to be involved, and also a realistic estimation of the effort to develop and implement the project deliverables (see for example: Avison & Fitzgerald, 1995; Checkland & Scholes, 1990). Failure to do so, makes the project more likely to be doomed as a chaotic experience.

There are many explanations for such practices. One is that many of today's organisations rely on IT for a competitive advantage, and thus they attempt to speed up the development and implementation of systems to exploit business niches with more advanced IT based products, services and capabilities. Another possible explanation is that organisations tend to be under severe pressure to cut costs and maintain business operations with certain level of quality to remain competitive.

Even by knowing the consequences, organisations tend to rush through the first phases of planning and concept development. Without adequate planning, and risk assessment, projects and especially large and complex ones are likely to find their fate in failure.

The literature also shows that large projects are executed better if broken down into a series of smaller, more manageable and easier to understand phases. Unlike large complex projects, a series of smaller projects can be completed as manageable endeavours.

In the UAE ID project for example, the nature of the project required the breakdown of its major activities into different streams i.e., preparation and set up of data centre and disaster recovery sites, registration centres, interfacing with other government databases, legislations, redundant network architecture, media and marketing campaign, etc. Although all these streams had project leaders assigned to them, the programme manager had the overall responsibility

to ensure proper communication is in place and that all project leaders are aware of the big picture of how their sub-projects will connect with each other.

Therefore, the PROMOTE methodology breaks down the project in to two stages; stage one puts emphasis on concept development, business requirements definition and planning, and the second stage deals with the management of the project implementation.

It is important to recognise some of the fundamental project management challenges and issues identified in the literature and attempt to address them in the methodology as much as possible. During the literature review it was found that a significant number of researchers continuously emphasised the need for organisations to seriously analyse successful, failed or out-of-control IT projects, and the associated challenges (see for example: Buxbaum, 2004; Callaway, 1999; Chin, 2003; Correia, 2004; Davenport, 1998; Davenport, 2000; Duris, 2002; Fichter, 2003; Grossman, 2003; Hammer and Champy, 1994; Huber, 2003; Keen, 2003; King, 2003; McManus & Wood-Harper, 2003; NZIM, 2003; Royer, 2003; Pollock, 1998; Warchus, 2002; Young, 2003; Zimmer, 1999).

Nonetheless, and as discussed earlier that research to date has found no single explanation for system success or failure. Nor does it suggest a single or a magic formula for success.

However, it has found different elements leading to project success or failure that this research study attempted to explore and consider in the development of the methodology. These factors are referred to in this study as the design elements. Table 4.2 demonstrates these elements and where they were incorporated in the methodology.

Table 4.2: PROMOTE Design Elements

	Methodology Phase	Design element
Phase 1	Initiation and Organisation	Management Commitment Concept development
	Assessment of Current State	Business Strategy Focus
	Future State Design	Business Strategy Focus Requirements Definition
	Tendering, evaluation, and Vendor Selection	Formal contract Requirements analysis
Phase 2	Programme Management	Project Management Management Commitment Communication and management reporting
	Organisation	Utilisation of resources
	Planning	Project Schedule Utilisation of resources
	Control	Project control (quality, schedule, Scope, budget) Changing targets Complexity Management Management of stakeholders expectation Risk Management
	Methodology	Formal Methodology
	Watch List	Risk Management Knowledge management
	Requirements Validation and implementation	User Involvement Requirements analysis Complexity Management
	Deliverable evaluation and system acceptance	User Involvement Complexity Management Quality of output

4.2.9 Techniques and tools

A key element in the development of the methodology is the identification of the techniques and tools used in it. PROMOTE employs a set of tools and techniques – some of which have dominant applications - that are regarded as fundamental to the methodology, although they can be replaced, or substituted as better techniques become available, providing of course they address the same fundamentals. This raises an opportunity about how this methodology can legitimately develop and evolve over time without losing the essence of the methodology.

There are many tools and techniques advocated in the methodology to have a high impact on its effectiveness such as:

- SWOT Analysis
- Vision Development Model
- MS Project Plan
- investment justification model (Gunasekaran, et al., 2001)
- Data modelling tools (ERD, DFDs, etc.)
- ISO 9126 Quality Framework
- Tender evaluation process
- Risk Management
- Smart card testing techniques
- Change control process
- project communications and reporting techniques
- quality management approach
- deliverables review model
- Smart ID card assessment framework (card and chip security, algorithm, key length, etc)[3]

The underlined items above are new methods to PROMOTE methodology that were developed within this research to facilitate the management and implementation of the project. They were continuously refined based on the feedback of project teams and their need to accommodate the project realities.

Furthermore, various methods were used to plan and control the project activities. Though this case study the project team did not always stick to them, the following frameworks were found to be invaluable when used, as they

[3] This is not directly related to project management, and may not be relevant to IT projects not involving smart ID cards. However, for national ID card projects, the developed techniques were found very useful. The techniques were primarily used to evaluate the UAE and GCC ID card projects to provide a basic evaluation approach and clarify the level of security in the ID card chip, with reference to the algorithms and key length requirements against any potential forgery, as well as the certification requirements needed for the different components in the overall architecture. Nonetheless, the research study advocates that a further possible testing of the smart ID card based on international standards such (Common Criteria ELA4+ or FIPS-140 evaluation) by an external institute could add a value in certain circumstances to verify signature and encryption features. Details of the proposed techniques are provided in submission 4.

(1) initiation: involves starting up the project, documenting a business case, feasibility and assessment study to define the economic, social, technical, political evaluation of the system under consideration.

(2) planning: involves setting out the roadmap for the project by creating the following plans: project plan, resource plan, financial plan, quality plan, acceptance plan and communications plan. It also address aspects related to a organisation wide context, that deals with overall information system strategy, purpose and planning;

(3) execution: involves the building and validation of the project deliverables. It involves the implementation of technical, social, and organisational aspects.

(4) controlling: controlling the project delivery, scope, costs, quality, risks and issues.

(5) closure: involves winding-down the project by releasing staff, handing over deliverables to the client organisation and completing a post implementation review. Post implementation evaluation and review concerns the measurement and evaluation of the implemented system and a comparison of the original objectives.

With the above elements defining the boundaries, the PROMOTE methodology gives attention to the following critical elements identified in the literature as key requirements for project management success – see also Figure 4.9 (e.g., Devaux, 1999; Lake, 1997):

1) scope definition and management
2) deliverables quality
3) resource management
4) schedule
5) budget

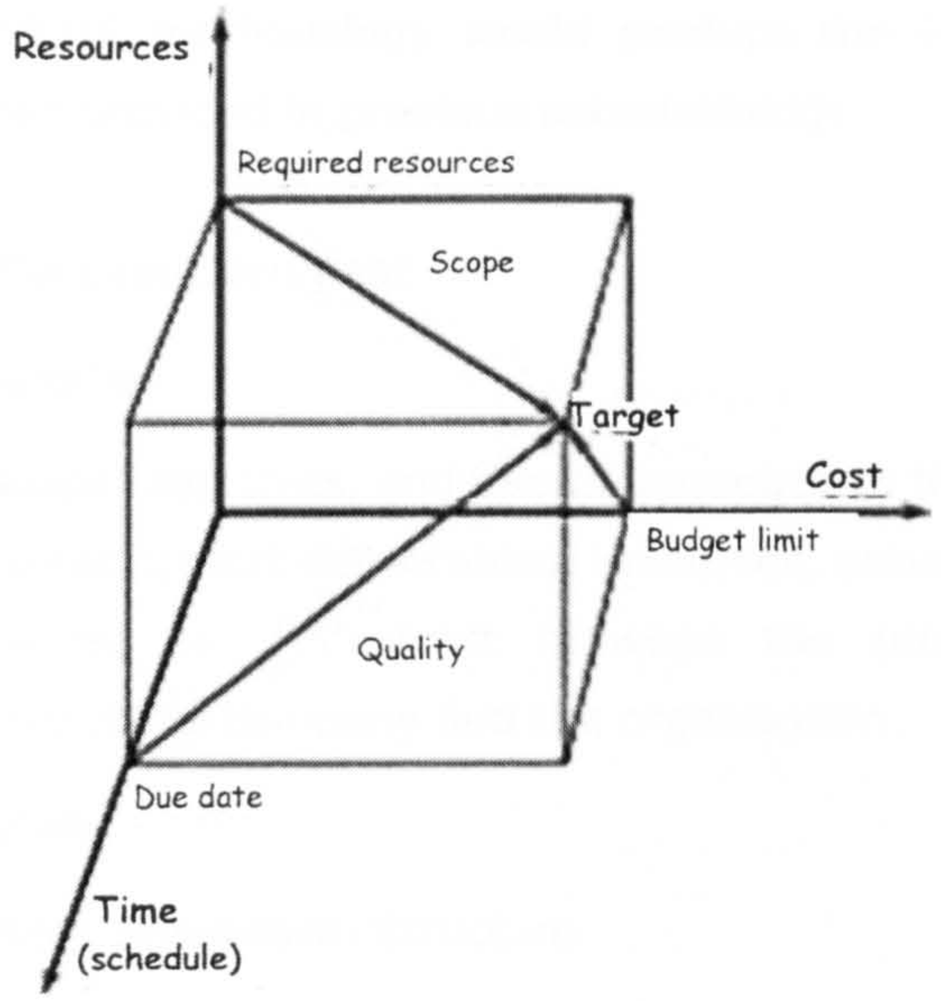


Figure 4.9: PROMOTE Methodology consideration factors

4.2.11 Outputs

This element is concerned with the outputs from the methodology. It defines what the methodology is producing in terms of deliverables at each stage and, in particular, the nature of the final deliverable. This can vary from being an analysis specification to a working implementation of the system.

Each project phase may well go through the same lifecycle, where the output of one phased cycle may feed input to initiate another phased cycle. This interaction is illustrated in Figure 4.10.

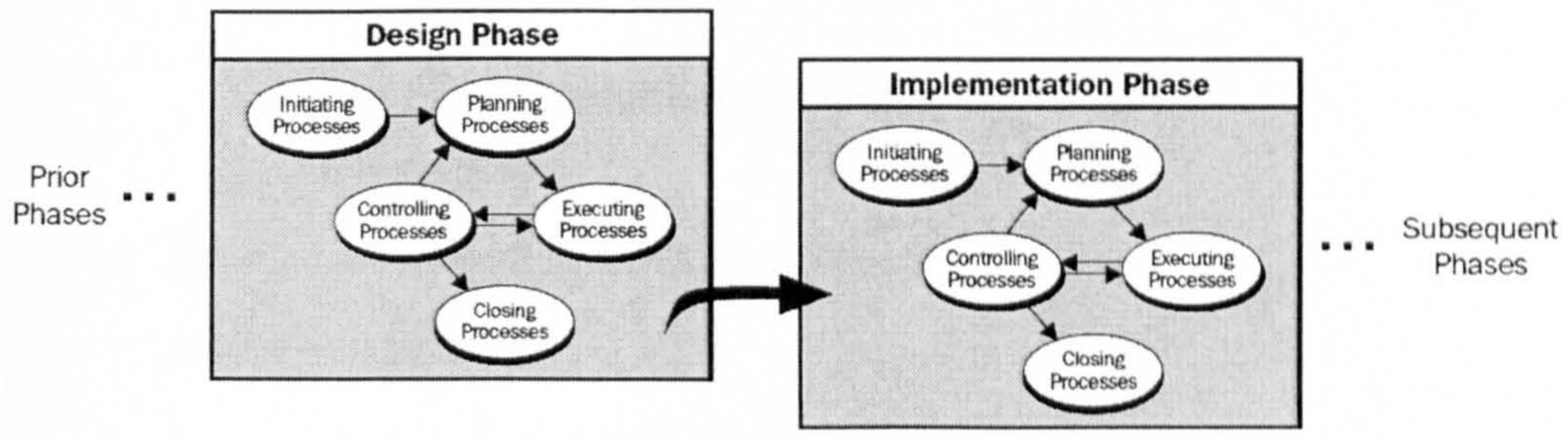


Figure 4.10: Interaction between phases

Represented as processes, Figure 4.11 depicts some of the dynamic deliverables in the PROMOTE methodology life cycle that are normally reviewed and updated several times to accommodate project realities.

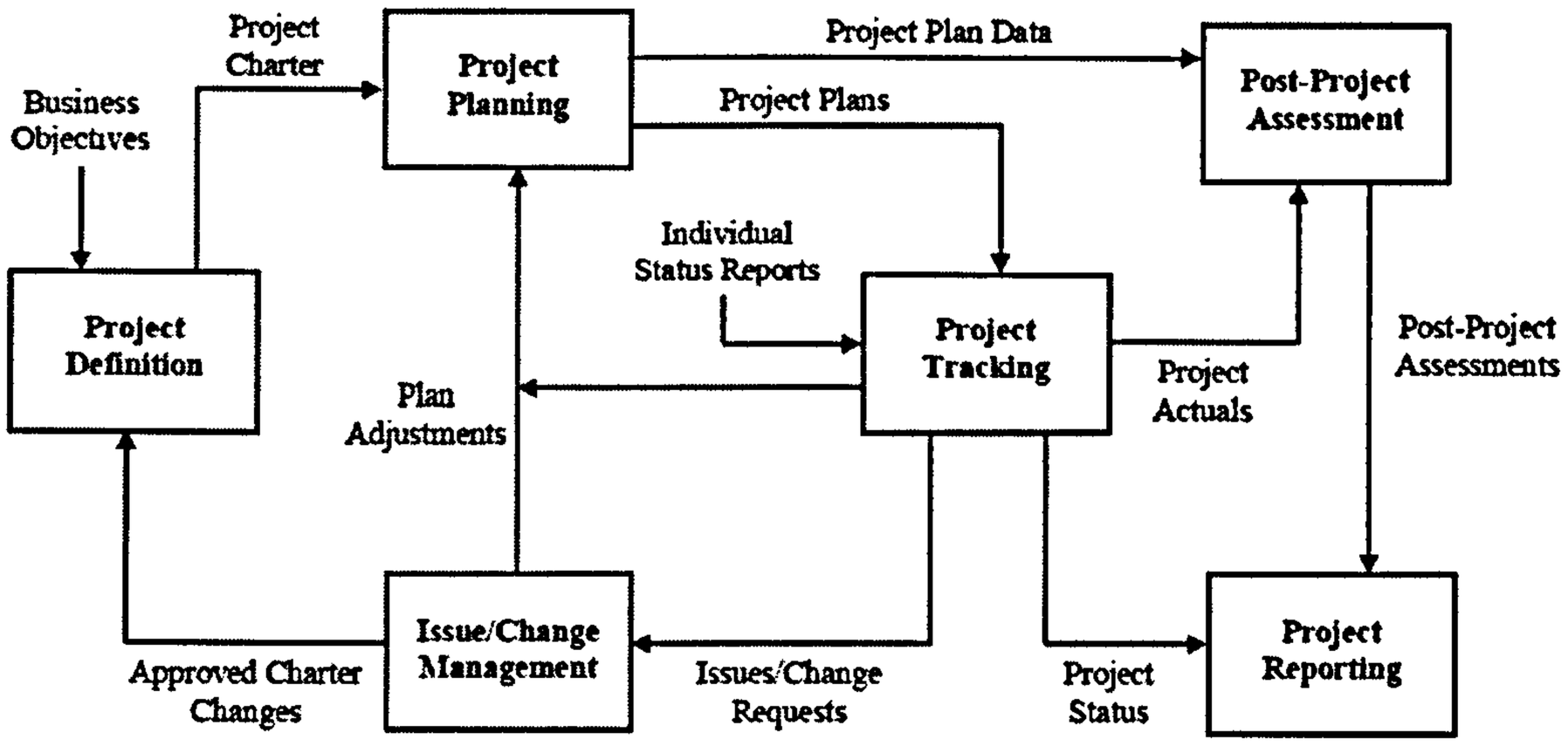


Figure 4.11: Dynamic deliverables in PROMOTE Methodology

The adopted procedures in the methodology provide the means of verifying the completeness and correction of project deliverables at each stage of the project lifecycle; thus allowing the processes to be repeated. This is clarified in the concept of feedback (depicted in Figure 4.12) that PROMOTE methodology adopts to achieving control and improvement of each of the proposed processes (deliverables).

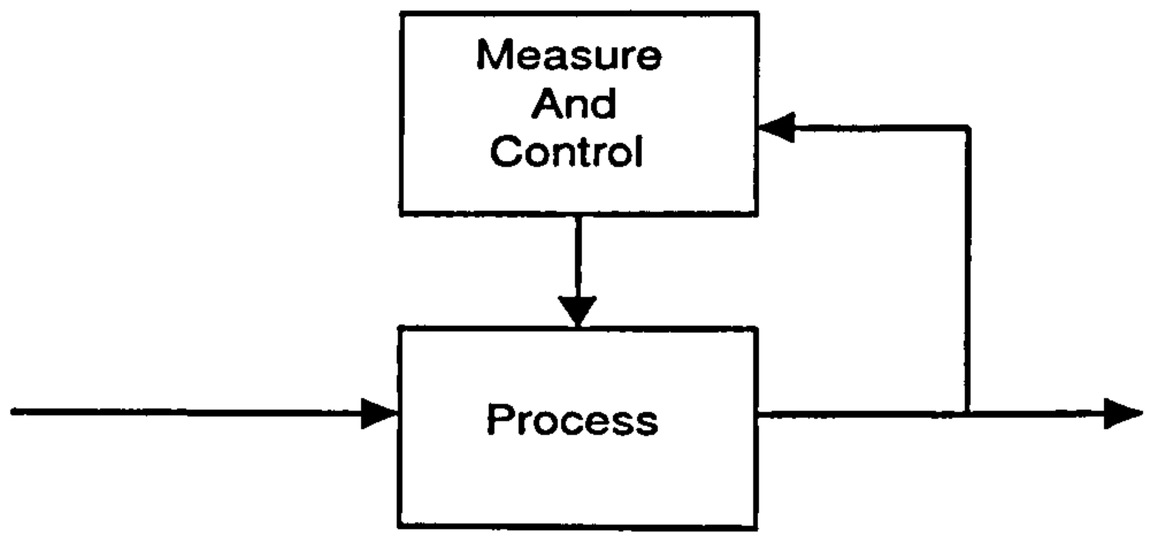


Figure 4.12: Process Control and Improvement Cycle

4.2.12 Practice

This element of the methodology is measured according to:

- The methodology background: whether it is intended for commercial or academic use and development;
- The User base: including numbers and types of users;
- The participants in the methodology: can it be undertaken by users themselves or must professional analysts be involved; and what skill levels are required.

The practice includes and assessment of difficulties and problems encountered, and perceptions of success and failure. This is envisaged to be undertaken by investigating the experiences of the users of the methodology. Indeed, this will inevitably be subjective, depending on who is consulted, but it can be a revealing exercise.

In examining the practice, the degree to which the PROMOTE methodology can be, and is, altered or interpreted by the users according to the requirements of the particular situation was assessed as part of the undertaken research study.

This has resulted in some modifications to some of the project phases and the introduction of some additional activity elements to address such requirements as explained in sections 4.2.8 and 4.3.

The background of the proposed methodology is identified to have been originated from both academic and practical (commercial) spheres. The user base is certainly difficult to discover at this point of time, as the methodology is new in nature. The user base of the methodology in this study is currently three different governments implementing ID projects.

The last sub element of the practice requires an analysis of the players involved. This requires answers to the following questions:

1. 'who is supposed to use the methodology?'
2. 'what roles do they perform?'
3. what skills are required to perform such roles?

Project management professionals are the end-users of the methodology. Their role would be any project management related activities. The levels of skill required by such players vary considerably – this is discussed in detail in chapter six.

In the proposed methodology considerable training and project management experience is necessary for at least some of the senior project managers. The methodology incorporates to some extent such requirements within the methodology phases in its aim to improve and develop the skills of project teams.

4.2.13 Product

The last element of the framework is the product of the methodology. According to Avison and Fitzgerald (1988) this may consist of software, written documentation, an agreed number of hours training, a telephone help service, consultancy and so on.

This innovation report is designed to explain the methodology components and how it can be applied. The previous submissions (1, 2 and 4) provide a more in depth view of how the methodology was applied. The case study presented in Appendix-A provides a reference for how the methodology can be applied in practice.

4.3 Methodology Testing

The methodology was tested in the UAE national ID project which formed a core action centred research element to this EngD programme. The submissions outline the details of the work carried out through this research undertaking.

The methodology was also partially tested in other large scale projects part of other national ID initiatives in the region, namely Saudi Arabia, Oman, and Bahrain; who started their projects in 2006. The methodology was communicated and discussed with the GCC officials in the form of workshops primarily in the technical GCC committee meetings.

The author was a key member of the GCC committee. The committee was formed to set the standards for national ID programmes and involved key members from the programme management teams from the six GCC countries.

The PROMOTE model was refined at several stages to address common problems identified in the UAE project, from the literature, and the experiences reported at GCC committee meetings, and from other large scale implementations around the world (i.e., from discussions with government officials involved in ID programmes in conferences and visits to their countries).

These changes included:

- Additional step: business case development (Step 1.3.3)
- Additional step: conflict management committee (Step 2.1.3)
- Additional items to Watch List –CSF (Step 2.2.1):
    - user involvement and training
    - regular review of contract terms
    - emphasis on management of the client-vendor relationship to build mutual understanding and shared objectives.
    - keeping an eye on international standards development

The detailed description of each stage of the proposed methodology is described in submission 1, 2 and 4. Appendix-A provides a summary of how the methodology phases were executed and contributed to the overall management of the national ID system in the United Arab Emirates.

The next chapter provides a comparison of the developed methodology with other standards in the project management industry.

Chapter

5 Methodology Comparison

Summary: *This chapter provides a comparison between the PROMOTE methodology developed in this research and other established standards in the project management industry. The comparison highlights similarities and differences, unique features and possible limitations of the PROMOTE methodology. An overview of project management practices in comparative countries is also provided; based on personal interviews with government officials managing large scale national IT programmes.*

5.1 PROMOTE and other project management standards

The project management methodology proposed and utilised in the UAE program and partially in three other GCC countries has acted as an effective approach to the overall management of the programmes. This assertion is primarily based on the results obtained which demonstrated the methodology's contribution towards many aspects of project management such as improving the coordination of resources and activities, project control and risk management, deliverable review and acceptance process, final end product etc. Examples and discussion of the methodology contributions are elaborated in chapter 8.

For the purpose of highlighting the similarities and differences between PROMOTE and other industry standard tools, and due to the large number of methodologies and frameworks available in the market, the comparison exercise was limited to three international standards (1) PMBOK, (2) PRINCE2, and (3) ISO 10006.

The reasons behind this choice are that the PMBOK and ISO standards are internationally recognised for being globally relevant, widely accepted and used (Crawford, 2000; Stanleigh, 2007). PRINCE2, the UK's de facto project management methodology in both public and private sectors, is viewed as a semi global standard (Crawford, 2000; Crawford et al., 2007). It is gaining popularity

and spreading to other around the world, such as the Netherlands, Italy, Australia, Japan and others (Swart, 2006).

The current literature quotes these three standards to have supported the implementation of IT projects widely (see for example: APM Group, 2003; Getronics, 2003; Office of Government Commerce, 2005). Although ISO 10006 is considered to be more of a guiding standard to quality in project management, all three standards are argued to embody essential practices for successful project management (Crawford, 2000; Froman, 1997).

Another important reason for this choice is the initial investigation of the most common standards used by governments during visits and meetings with officials in this research. PMBOK was the most often quoted, PRINCE2 mainly in European visited countries, and ISO 10006 was quoted as a comprehensive quality framework to improve both project processes and products in many of the international conferences attended.

5.2 Overview of PMBOK, PRINCE2, ISO10006

Prior to the comparison discussion, a short overview is provided on the three methodologies (PMBOK, PRINCE2, ISO10006) against which the PROMOTE methodology was compared. Please refer to submission two for a more comprehensive review of these methodologies.

5.2.1 PMBOK

One of the best known project management models is the Project Management Body of Knowledge (PMBOK), which is the standard put forward by the Project Management Institute[4] (PMI). The Project Management Body of Knowledge (PMBOK) developed by the Project Management Institute (PMI) is widely accepted to be one of the best known project management models (Wideman, 2002).

PMBOK was developed with the aim to create a systematic approach to the study of the Project Management (PM) profession and as basis for the assessment of

[4] The Project Management Institute (PMI) is the world's leading professional project management association, with over 86,000 members in 125 countries worldwide.

the competence of PM personnel. The guide - written in 216 pages - describes the sum knowledge within the profession of project management required for a project manager to be successful.

5.3.2 PRINCE 2

PRINCE is an acronym for **PR**ojects **IN** **C**ontrolled **E**nvironments. It is widely used in both public and private sectors in the UK as a 'de facto' standard for project management and is gaining popularity in many European countries. PRINCE2, an enhanced version of the method was developed to provide a more generic framework for managing projects.

The methodology - written in 408 pages, is a process-based approach providing an easily tailored and scaleable method for the management of all types of projects. Each process is defined with its key inputs and outputs together with the specific objectives to be achieved and activities to be carried out.

5.2.3 ISO 10006

The international standards for project management reflected in ISO[5] 10006 are similar in nature to the PMBOK guide from the Project Management Institute but with less comprehensive coverage of the topics. The ISO 10006 manual gives guidance on the application of quality management in projects.

ISO states its objective to provide guidance on the application of quality management to improve both projects processes and products. According to the guidelines a significant opportunity exists to apply the "ISO 10006: Guidelines for Quality Management in Projects", and that by following this guideline in the

[5] The International Organisation for Standardisation (ISO) is a specialised international agency that promotes the development of precise standards to help ensure that products, services, and materials throughout the member nations remain consistent. This standardisation helps to facilitate the international exchange of goods and services and to develop cooperation in intellectual, scientific, technological, and economic activity. The results of ISO technical work are published as international standards. The hope is that if a company uses processes that result in the achievement of an ISO certification, the products produced by that process will meet some minimum standards of all countries in the area of relevance.

management of projects will add quality to the process of managing the project as well as the quality of the end product, service or end result of the project.

This view is based on the fact that quality is an integral part of good project management. The standard is argued to be applicable to projects of varying complexity, small or large, of short or long duration, in different environments, and irrespective of the kind of product or process involved.

5.3 Basis for comparison

The project tried as much as possible to establish a practical common ground for comparison. Methodologies can be compared for either academic or practical reasons.

For academic purposes (Avison and Fitzgerald, 1988) it is to better understand the nature of methodologies in order to perform classification and to compare future information systems development. For practicality, Avison and Fitzgerald (1988), involves the selection of a methodology for a particular applications or a group of applications.

Table 5.1 provides a high level evaluation of the PROMOTE methodology in relation to the three standards using Avison and Fitzgerald's (1988) framework. There follows a discussion on the methodologies to highlight the similarities and differences with regards to the new methodology proposed in this study.

Table 5.1: Comparison of PROMOTE with other standards

Criterion		Methodologies			
Element	**Elements**	**PROMOTE**	**PMBOK**	**PRINCE2**	**ISO 10006**
1.Philosophy	**Paradigm**	Systems	Systems	Systems	Scientific systems
	Objectives	project management	PM Knowledge base	Implementation management	Quality management
	Domain	Planning & control	General Approach	Execution	Planning & Control
	Target	Large government IT projects	PM profession	Large organisations regardless of industries	Projects of varying complexity and size
2. Model		9 stages covering PM phases of : initiating (I), planning (P), executing (E), monitoring (M), control (C), & closing (C)	5 process groups (IPEMCC) knowledge areas covering the management of: Integration, Scope, Time, cost, Quality, HR, Communication, Procurement, & Risk	4 phases: project start up, Initiation, Implementation, and closure	processes related to strategic, interdependency, scope, time, cost, resource, personnel communication, risk, purchasing
3. techniques and tools		Various sets of tools and techniques and introduces > 7 new methods (see section 4.2.9)	many Conceptual frameworks & > 150 process tools and techniques to address project areas	Product based planning Quality review Change control Configuration management	Process and product based
4. scope		Project management	Project Management Best Practices	Organisation, management and control of projects	Quality management principles and practices.
5. Outputs		is based on each process in the Model	is based on each process in the Model	Phase-based	Process-based
6. Practice	**Background**	Commercial with an academic rigor	Commercial	Commercial	Commercial
	User base	4 GCC countries	US international standard de facto global PM standard - Recognised in over 120 countries	de facto standard for Project Management in the UK	Global standard
	Players	PM Members	PM Professionals	PM Members	PM
7. Product		Yet to be commercialised	PMBOK® Project Management Institute, USA. Public domain	PRINCE2™ Trade Mark of the Office of Government Commerce Public domain	International Organisation for standardization Public domain

5.31 Design and structure

It is worth highlighting at this point that the origins, vocabulary, areas of knowledge, tools, sections, clauses and other aspects of PMBOK, PRINCE2, ISO 10006 were observed to be widely different. This is to say that during the review exercise, it was found that methodologies have their own ways of laying out the processes, procedures, best practices and templates required to successfully manage projects.

The two staged PROMOTE methodology distinguishes itself from the three established standards in the design and the layout of its processes. These are seen to be more appropriate and follow the logical sequence of a typical project lifecycle based on the feedback of project management teams both in the UAE and the three GCC countries. The lifecycle of each methodology is discussed more thoroughly in the next section.

5.3.2 Project Management Lifecycle

The PMBOK Guide includes around 40 processes within 5 project management process groups of initiating, planning, controlling, executing and closing, and all organised into nine knowledge areas. Wideman (2002) states that the Guide takes the best approach for purposes of teaching the subject content of each knowledge area, but is not so effective when it comes to providing guidance for running a particular project.

It is commonly seen as a knowledge repository for tools which can be applied by project managers to projects. However, it is not intended to tell people how to apply any of the techniques or use any of the tools described, but rather to be more of a guide to good practice techniques but with little guidance on when and how to use them (Wideman, 2002).

The PROMOTE methodology recognises the 5 phases of project management and uses it as a basis for planning and controlling the project activities. It also recognises that these phases are part of the overall project management life cycle and need to be managed as part of a methodological approach.

The PROMOTE methodology covers the nine knowledge areas with "an adequate level of attention". This statement is based on the feedback of PMP certified

professionals working in the UAE project and other project management professionals in the GCC countries.

PRINCE2 is a process-based approach for project management, where each process is defined with its key inputs and outputs together with the specific objectives and activities to be carried out. PRINCE2 recognises project life cycles to having five phases; conception (original needs), feasibility, implementation, operation and termination, however, of these, PRINCE2 only covers the implementation phase. Furthermore, PRINCE2 focuses on key risk areas only, and does not provide focussed attention to each knowledge area like PMBOK.

ISO 10006 identifies seven project management process groupings necessary to produce the project's product. These relate to the project processes: planning, organizing, monitoring, controlling, reporting and taking corrective actions on a continual basis.

The standard indicated that the project process is interrelated to other processes within the organisation and recognises that all work is a process. However, the ISO 10006 project management process groupings do not appear to follow in a logical sequence. While each process needs to be done at various times during the course of managing the project from beginning to end, it is not clear as to the sequence in which the steps are to be taken.

ISO 10006 is not a complete guide to project management, but a set of recommendations around quality in project management processes. Advice pertaining to a project's product related processes, and on the process approach, is covered in ISO 9004. ISO 10006 defines a project as including non-repetitive phases. However, this is not always the case on a project in PMBOK, ISO, and PROMOTE. At times, phases may be repeated but the end result may be unique.

As in PRINCE2, procurement and system development aspects are not directly supported in PROMOTE however controls and breakpoints are highlighted to work successfully within a contractual framework.

PROMOTE, although not as comprehensive, covers the nine knowledge areas within PMBOK with focus on planning and controlling elements. The processes in PROMOTE that are aligned to the PMBOK guide consist of eight stages that were designed to follow the logical sequence of a typical project lifecycle.

Overall, PMBOK and PROMOTE cover the project management lifecycle more than does PRINCE2 and ISO 10006. This is due to the nature and limitation of:

PRINCE2: being an implementation methodology rather than a whole project management methodology. The PRINCE2 manual states that 'most of what in PRINCE2 terms will be stages will be divisions of 'implementation' in the product life span.' (p234); and

ISO 10006: The manual states that the standard is not intended to be a guide to project management but rather to give guidance on how quality issues impact project management. It is comprehended to provide no adequate coverage of fundamental project management elements such as, change and communication management.

5.3.3 Project Management Responsibility

Another interesting difference between the methodologies is in the responsibilities of the project manager. The PMBOK guide and ISO 10006 assume that the project manager is completely in charge of the entire project with total business responsibility.

In sharp contrast, PRINCE2 and PROMOTE recognise the project manager as an individual given authority and responsibility to manage the project on a day to day basis to deliver required products within the prescribed range of scope, quality, time and budget.

The authority beyond these limits lies with the project board or steering committee. It is the head of the board; or steering committee who has the ultimate responsibility for the project.

5.3.4 Methodology Control

The design of the PRINCE2 manual - perhaps because of its nature as an implementation methodology - assumes that the methodology is in the hands of the supplier rather than the client organisation. This has a bearing on both the organisation and the details of control. The issues of work coordination and responsibility are much more complex with PRINCE2.

The PMBOK Guide, and PROMOTE (and ISO 10006 to some extent) are designed from the project owner's perspective – as a means of achieving an organisation's strategic goals - rather than from that of a supplier standpoint. It must also be heeded that the major difference with PROMOTE lies in the fact that it was developed for government organisations. Its applicability to other industries, and vendor control would require further testing and is likely to result in some radical modifications from process perspectives.

5.3.5 People Management

From the people management perspective, PRINCE2 gives little attention to people management issues, ISO 10006 to some greater extent, PROMOTE gives further attention, but not as much as PMBOK, as it considers it to be a phase in itself; project human resources management. This area was addressed in the ID card project through the change management processes discussed in submission two.

An overview of this is also provided in chapter six where it is critically reviewed to demonstrate how people management is a crucial skill of project managers to drive projects to success. Appendix-A also provides further examples in this regard.

5.3.6 Quality Management

The definitions that all four methodologies provide for identifying quality standards, although stated differently, are similar. According to the methodologies, all projects must identify the quality policy and standards that are applicable and how the project management team will implement its quality policy. These standards or procedures are then put into the project plan with a process that can identify whether or not the team is managing the project in accordance with the quality policy that has been established.

5.3.7 Management responsibility

ISO 10006 and PROMOTE include that senior management have a critical role to play in overseeing projects to ensure success. They do this by providing support, approvals, etc (see chapter six – section 6.1.2). Their understanding of what

they need to do to ensure project success is considered central. PMBOK and PRINCE2 do not cover this important aspect of project management with much emphasis.

5.3.8 Customer/Stakeholder Focus

ISO 10006 and PMBOK emphasise a customer centric approach to succeeding with projects. PRINCE2 is business case driven. PROMOTE although viewed largely to subscribe to the customer centric approach, relies on the business case, which is documented in the *charter,* to describe the organisation's justification, commitment and rationale for the project's deliverables and outcome.

The business case is regularly reviewed in conjunction with the project's progress to ensure the business objectives, which may well change during the life of the project, are still being met, and that any deviation from the original plan is well thought through and implications in terms of schedule, resources, cost, and quality aspects are outlined, and approved by the key stakeholders.

PMBOK and PROMOTE describes the various stakeholders, including all those who may impact or are impacted by the project. Stakeholder analysis is an essential activity in the PROMOTE methodology to gain clearer understanding of stakeholders and, as a result, provide insights as to how best to engage them. PROMOTE uses stakeholder metrics to ensure that projects focus better on the critical requirements, and that projects are better able to measure their achievements, and to adapt to feedback.

5.3.9 Supplier management

ISO 10006 and PROMOTE describe the need for a mutually beneficial supplier relationship but the PMBOK is not as clear in this area. PRINCE2 does not address this area in the methodology and considers it to be managed separately.

The PMBOK mentions the need for good contractual agreements but this is not quite the same. According to PROMOTE, a good contract does not always equate to a mutually beneficial supplier relationship.

It argues that the current approaches to the management of projects emphasise a need for the internal organisation's project plan to be merged with the supplier's. This ensures that critical inter-dependencies are identified and managed (see also chapter 6– section 6.2.4: supplier relationship management).

5.3.10 Documentation

From a documentation perspective, PRINCE2 and ISO 10006 are viewed to be a heavy documentation methodology. Each process requires the production of many documents which make them very difficult to manage and maintain. The PMBOK guide and PROMOTE encourage the development and use of 'project charter' to define the required project management and control structure and views it as the single most important reference throughout the life of the project.

The PROMOTE methodology puts greater emphasis on the charter document. It requires it to specify the project boundary and the completion criteria. It also considers the document to provide a formal agreement of what the project is committed to deliver, the budget, time constraints, resources, and standards within which it must be completed.

5.3.11 Product Realisation

Studies on the subject of project life cycle management indicate that there is room for improvement in both PMBOK and PRINCE2 standards for dealing with the final phase of a project in which the product(s) are transferred into the care, custody and control of the customer or user (Wideman, 2002).

Indeed, the product resulting from the project may be excellent and fully up to specification, but if the final transfer is not handled with appropriate delicacy, the reaction to it may still be negative and the project seen as a failure (ibid). Wideman (2002) uses the term "delicacy" advisedly, because this part of the project is often fraught with political overtones.

The PROMOTE methodology addresses this final phase with great deal of attention. In the case study the use of the ISO 9126 quality framework for evaluating the project product(s) was perceived to act as a comprehensive analytical tool to achieve a more thorough view of the system's strengths and weaknesses and the improvement of the quality of software and the productivity of the development process. A very structured project closure approach was

followed to ensure that the project was brought to a controlled end (See appendix-A for further details on this subject).

5.3.12 Implications for Management

Though one may argue that methodologies if viewed on the micro level have many similarities, differences are present in the emphasis of each methodology. Many researchers argue that standard methodologies and frameworks cannot be applied straight out of the box nor detailed to a level at which they are ready to use as they are aimed at a wide spectrum of projects (Devaux, 1999).

However, many researchers and practitioners observe projects to have common characteristics that can be formalised into a structural process, which should allow a more effective management of such endeavours.

The PMBOK and ISO 10006 Standard present a set of knowledge and guidelines relating to the management stages of projects. However, projects could never be successfully managed by following these guidelines alone (Bredillet, 2002).

First, neither standard identifies the process of managing a project from beginning to end in a logical sequence. They both identify the global processes, but not the steps necessary within each one nor do they identify how to use the guidelines for a small versus a large project. Although ISO 10006 for instance, explains how to perform risk assessment or manage a change request, it is not always clear about where each of these processes fit into the overall process of managing the project.

PROMOTE builds on the knowledge embedded primarily in PMBOK guide and ISO 10006 standard. It uses ISO 10006 guidelines to ensure that the following processes adhere to quality standards for:

- managing each sub-project is clear and well documented;
- creating and maintaining the team is documented;
- managing change on the project is apparent and documented;
- managing risk is continuous, is documented and followed;
- reviewing task completion is documented and followed;
- reviewing the budget is documented and followed;
- closing and evaluating the project is documented and followed.

The PROMOTE methodology advocates the ISO 9126 standard for software quality assurance to ensure adherence to quality standards and stakeholder satisfaction. It also uses some key components and techniques from PRINCE2 related to:

- Organisation ("Project Board"),
- Product-Based Planning,
- Product Descriptions,
- Quality Review,
- Configuration Management,
- Change Control,
- Work Packages.

PMBOK was used to gain understanding of project management foundations, as well as some of the recommended tools and techniques and processes related to acquisition and procurement planning, contract closeout, and project human resource and communication management.

Furthermore, in the organisation phase of PROMOTE, the project management office assumes the responsibility of training and qualifying the staff in the project management field i.e., through enrolment and certification in PMP certification tracks.

In the application of PROMOTE methodology in the UAE and GCC countries, project teams were required to attend PMP courses to gain PM knowledge. One of the team leaders indicated that PMBOK provided him with what as a project manager should know to manage a project successfully, and PROMOTE methodology provided him with the a set of processes to go about the project implementation and carrying out his tasks.

One important element that is viewed as distinguishing the PROMOTE methodology is in its tested application. The literature provides no in depth case studies of the application of these three approaches (I.e., PMBOK, PRINCE2, and ISO 10006). The few available publications on these subjects are limited to the description of the processes, and do not show how each process and sub processes were implemented.

To be fair to such approaches, organisations typically will not give credit to the methodology if projects succeed, as much as to the organisations themselves and their management expertise. In fact, organisations use such personalised

approaches as a marketing tool for their projects to gain reputation, or on the other hand, to increase the chances of selling a project management service.

As discussed earlier, the existing literature on project management shows that projects are evaluated based on three variables; scope, time, and cost. Together with very high level discussion of the methodology, such evaluation studies focus on micro elements that lead to either project success or failure.

5.4 Project Management Practices in other countries

In the course of this study, more than 40 relevant conferences were attended and more than 18 countries were visited part of official delegations. These are listed in appendix-D and Appendix-F. Those conferences and official visits provided an opportunity to discuss and understand the methodology or process followed by governments in implementing national ID projects in specific and large IT systems in general.

There was a difference between the responses of Western countries and those in Asia. In the West, officials indicated that they use some structured in house developed methodologies and mix of international standards such as PMBOK. Consistent with the existing literature, it was also indicated that the PMBOK was used as a guideline and best practices, and not as a methodology in itself.

Another interesting finding in this regard was from the UK. The UK officials indicated that they use of a structured methodology in managing IT programmes, but also indicated that PRINCE2 was not used in projects such as the recent iris[6] implementation in all UK airports and other recent large IT programmes. In an attempt to investigate this further, the company in charge of the implementation in the UK was approached. The company which is an international European company claimed to have used its own implementation methodology to deploy

[6] Iris-recognition technology is used for immigration control across the UK's main international airports. Those accepted will have their eyes filmed using a standard video camera to capture their iris patterns and this data will be stored alongside personal details. They will then be able to enter the UK through a special fast-track immigration control using an iris-recognition camera.

the system, and that it was customised to meet the requirements of the UK government.

PRINCE2 as indicated by one of the officials: 'is often used when the development is in-house and when the control is in the hands of the implementer. The nature of the project such as the recent iris programme requires a somewhat different process to keep us, the government, in control of how the system is being implemented.' This finding is consistent with some of the limitations of PRINCE2 highlighted earlier.

On the hand, in Asia and Middle East countries, senior officials were found to be less aware of methodologies. Perhaps this is better explained by Devaux (1999) when he says:

> "Senior management, as often as not, takes a 'hear no evil' approach: 'I don't care how you do it, just get it done on time. I have more important things to worry about than these project things." (p.xxv)

The survey conducted as part of this study in submission three, shows that many GCC organisations tasked IT departments to champion technology projects, with the belief that they have better understanding of such projects. This is cited in the literature as one of the key and most common reasons for systems projects failure. IT people do not understand the business goals and strategy very well and the political drivers even less.

Hence, organisations get IT systems that are not aligned with the business strategy or political goals. Submission one provided further detail on this subject. There are few publications about IT projects implemented in Asia which could have been referred to, to get further insights about the practices in this particular region. The survey[7] results from submission three are viewed to contribute notably to the current limited knowledge available in this regard.

During the subsequent course of interviews following the initial survey, many government officials highlighted the use of consulting companies in large IT projects. They also referred to the use of proprietary methodologies and

[7] The survey results were published in a journal article: Al-Khouri, A.M. & Bal, J. (2007) "Electronic Government in the GCC Countries," International Journal Of Social Sciences, Vol. 1, No. 2, pp.83-98

processes of those consulting companies with the belief that they include proven best practices - as claimed by the consulting companies.

These methodologies are generally 'home grown', based on the firm's experience. It was not possible to obtain further detailed information about such methodologies as they were considered to be 'classified information', as stated by many of the interviewees.

The following chapter reflects on the PROMOTE methodology and the sub-projects undertaken as part of this research study and pin points the critical success factors that are considered as integral components of this new methodology.

Chapter

6 Reflections and Consideration Factors

... some important research findings

Summary: *The elements highlighted here are viewed as integral components of the PROMOTE methodology. They are key in viewing how this work builds upon and then expands the current body of knowledge in the subject. The experience through the UAE project and feedback from the other projects indicates that they have a beneficial impact on the implementation of large scale IT project in general, and national ID projects in particular.*

This chapter is split into two sections. All the elements in the two sections are derived from key factors crucial to the success of ID card projects, and are considered as important elements to the overall implementation of the PROMOTE methodology. They were validated for applicability through discussions with government officials in 5 GCC countries and others visited as well as with the interviewed experts in Asia, Europe, Africa and US. Appendix-D lists the visited countries, and the personal details of the interviewed officials and experts.

The first section in this chapter identifies the project management issues that are also directly pertinent to other types of large government IT projects. The second is more closely aligned with the needs of ID card projects in particular. The items identified are considered "variables, which management can influence" (Hofer & Schendel, 1978) and if ignored, have the potential to cause adverse events that may affect project objectives, and expose the project to negative influences.

6.1 Project Management: Key Consideration Factors

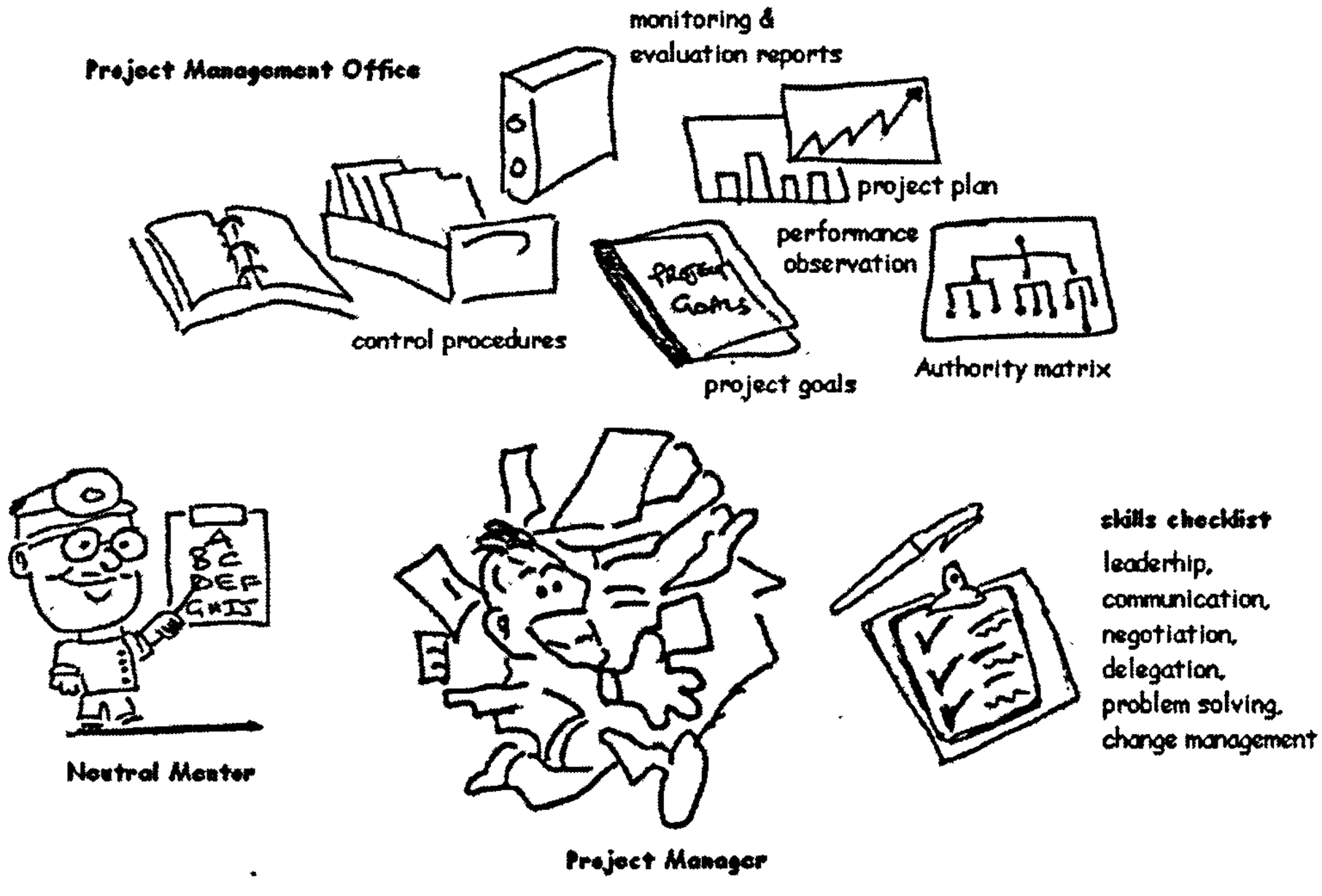


Figure 6.1: Critical Success Factor Elements

The following are important elements where organisations need to give careful attention when planning, monitoring, and controlling their IT initiatives. These elements are derived from an understanding of the literature, discussions with experts and most importantly from the practical experience gained through managing such projects.

Although the PROMOTE methodology addressed these areas to a great extent from a procedural perspective, their implications need to be comprehended properly to help deal with any adverse project developments. Figure 6.1 depicts these elements in a rich picture format. The following sections discuss these elements.

6.1.1 Keeping Everybody on the Same Page

"A man is on a boat. He is not alone but acts as if he were. One night, he begins to cut a hole under his seat. His neighbors shriek: 'Have you gone mad? Do you want to sink us all?' Calmly he answers them: 'I don't understand what you want. What I'm doing is none of your business. I paid my way. I'm only cutting under my own seat.'"

- Rabbi Shimon bar Yohai

A project must have clearly defined goals, which must be agreed by all involved so that everyone proceeds with the same expectation. This is an important consideration to avoid conflicts with the stakeholders' mental set goals and interests.

Project goals must be energising, and this energy comes from a feeling that the goal is realistic and do-able, yet challenging.

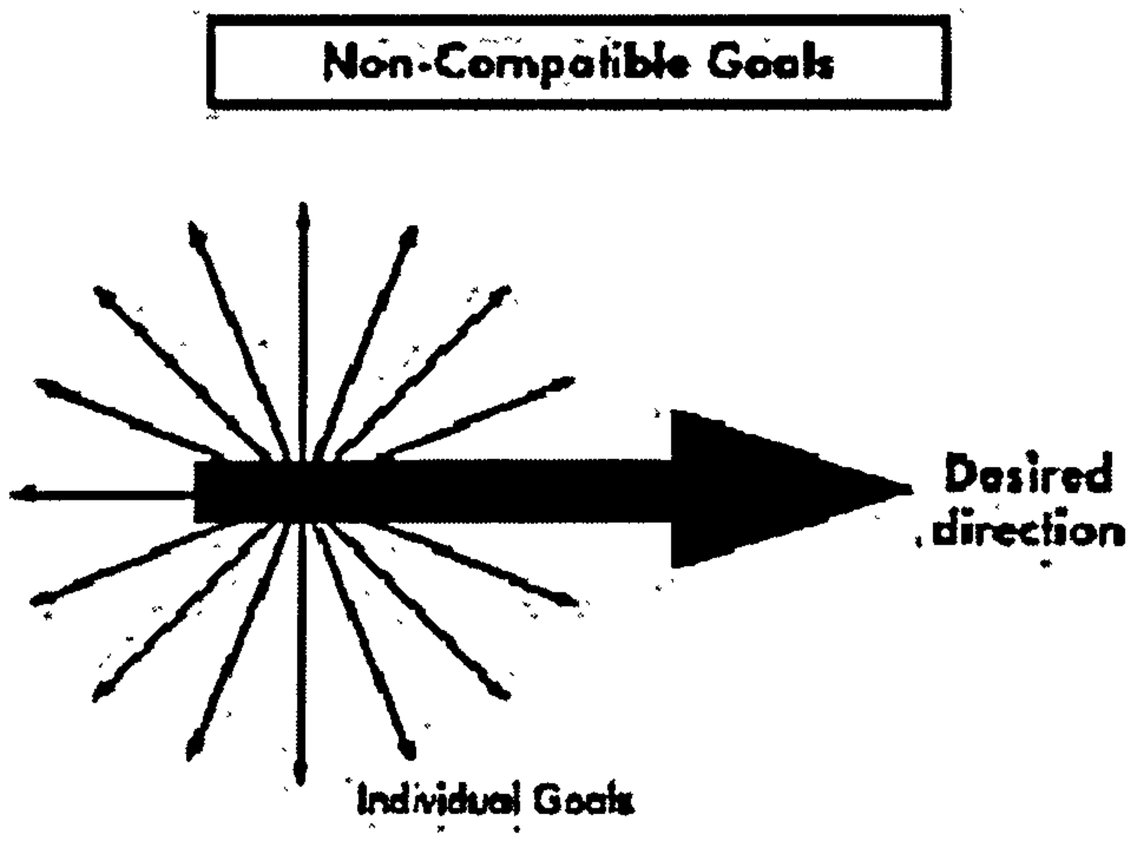


Figure 6.2: Project and individual goals

The vision, mission, project goals & individual goals should be blended together to ensure that everyone in the organisation is moving in the same direction. If the goals are not compatible, groups or individuals in the organisation start pulling in different directions and the overall progress of the project is affected.

Keeping the project team on the same page is fundamental. For example, it was realised in the UAE project that the project management teams needed to mentally start at the final destination of the project I.e., visualise the project final state and the expected deliverables.

Though the vision, goals, and objectives of the project were clearly documented in the beginning of the project, the nature and complexity of the UAE ID project drifted some of the project teams away from the primary goals and the bigger picture, focusing on issues and discussing unnecessary details that resulted in wastage of valuable project time and team energy.

In fact, and from the feedback received from the GCC officials and experts from many countries, it was noted that large projects such as the UAE ID project are very vulnerable to falling into this trap. One common blame statement among the officials was on the vendors who always try to sell more and draw rosy pictures of what could be achieved with the system. A further discussion on the client-supplier relationship is provided in section 6.2.4.

Having high calibre skilled staff was not perceived to be sufficient. Much time and effort was invested in communicating and re-communicating of project goals to all project team members in the UAE project, to create a compelling vision of the project's end results and its value to the country.

6.1.2 Management Ownership and Leadership

This often dooms the project to failure before it starts (Whittaker, 1999). The PROMOTE methodology attempts to secure buy-in from the top, through the development of a strong and clear business case backed up with a realistic project plan.

Large scale projects such as national ID projects require the support of many government organisations due to the *process/procedural connectivity required*. In the UAE case study, visible senior support was found to be essential for the success of the project. Such projects will surely fail if they do not enjoy the sustained support of the top political leadership, which alone can provide long-term commitment of funds; overcome the bureaucracy's inevitable resistance to change; and 'knock heads together' to make diverse departments work in concert (Shetty, 2003).

ID projects will normally face many challenges which may drive them away from achieving their stated objectives. One important factor that is not well covered in the current literature about ID projects is the in-fighting within the government itself, where some departments see ID projects as a threat to their existing work functions e.g., Ministry of Planning and Statistics may get their core function of conducting the census and producing statistics taken over by this new ID project; The Ministry of Interior may find their core functions taken over by other departments like in the case of the UAE where a new civilian organisation was established to manage the implementation of the ID project. These factors are considered among the primary restraining forces of such initiatives and need special attention to minimise their impact.

From the UAE case study and the feedback from other implementation programmes, the project director role is critical in large scale programmes. There was a common view among the officials in all countries that the project director must demonstrate sound leadership qualities. For the programme to be successful, they must be a strong and authoritative person, with high communication skills, and who can articulate the vision of the project, and see it through to its realisation. Unfortunately in many cases the project director has responsibility, without the full authority to address many of the factors challenging the project.

The need for senior management support is seen as critical to the success of a technology programme. In this research, it was found that there is a strong need for a senior responsible manager (referred to here as project director) who is much more than a mere technology advocate but has formal business benefits delivery responsibilities as well.

Many of the interviewed officials noted that there needed to be a single senior individual within the organisation who was responsible for providing strategic direction and ensuring that the project is focused throughout its lifecycle, on delivering its objectives and the projected benefits.

While many of the officials agreed that at an operational level, the responsibility for monitoring and controlling the project rests with the project manager, there is a need for management and control to be provided by a senior individual within the organisation. They could refer problems upwards to senior management and or ministries as necessary, in a timely manner to ensure resolution.

There was also a common agreement among the officials that the project director should be identified at the start of the programme so that they could influence the development of the overall business case for the programme and ensure benefits are identified and the strategy put in place for their delivery. An early identification of this individual would ensure that there is a coherent organisation and governance structure and a realistic implementation plan to ensure the delivery.

Many of the participants felt that the key to delivery of successful programmes is senior managers being identified and having ownership of the delivery of the key benefits associated with the programme. Many of the survey and interview participants noted that the there are many examples where 'multiple' or 'committee' ownership of a project has diluted accountability, diffused authority and led to slower, less responsive decision-making.

However, some government procedures require the establishment of committees like in the UAE and GCC countries for large scale projects. The project director headed this committee in the UAE. The director was the formal representative of the project to other government departments. The project director was at a strategic level, not at a tactical or an operational level.

The director was usually the delegating authority for major financial expenditure. Their support was perceived to be crucial in setting priorities, delegating authority, and clarifying directions when needed, an area of which was beyond the 'project management office' authority.

The project director in the UAE project ensured that the programme was focused throughout, from initial business case onwards, on delivering the projected benefits. This included ensuring that the business case was reviewed continually and that any proposed changes of scope, cost, or timescale are checked against their possible effects on the business case.

6.1.3 Project Management Office (PMO)

The project management office had the overall responsibility and authority to manage the project. The office was responsible for planning, organising and the coordinating the work, and leading, supervising, monitoring and controlling the project. The office was established to centralise accountability for project management.

It was also noted that a centralised PMO works well for a large programme such as ID projects. In some of the visited countries, however, it was not clear which department in the Ministry was completely responsible for the project. Several departments had separate pieces of responsibilities.

Though obvious problems could be seen with coordinating system interfaces as a result, this could not be validated – largely due to the limited information obtained. A centralised PMO office was observed to promote the concept of accountability better by the officials who had established them.

However, though we argue here that PMO is normally held accountable for the success or failure of the project, in reality, the minute a problem exists, accountability will typically shift quickly and the search will start to find a 'scape goat' elsewhere.

Another possible weakness of the PMO and a Project director with Project committee approach is that the PMO will keep passing decisions and issues UP the chain to avoid any possible bad consequences. This can also significantly delay decision making as often the management committee will only meet every month or quarter.

Another important aspect that was demonstrated by establishing a PMO is that it facilitated adherence to the project management methodology. A common pitfall, however, that was observed early in the UAE project was that the PMO became so focused on the methodology, and adherence to it became the project focus, and the project team forgot about the actual deliverables of the project i.e., the project teams became so focused on putting issues in the right place, using the right template, updating their sub-project MS plans, etc., that they forgot 'why' they were doing the project at hand. It was therefore, a constant reminder to the project team to focus on project artefacts and the methodology.

6.1.4 Project Managers

Project managers play a critical role in any project and their planning, controlling, communication approaches determine how well they perform and fulfil their duties. KPMG's 1997 survey of 1,450 IT projects both in public and private sectors revealed that project managers normally fail to address many project

management activities that in turn contribute to serious schedule and budget overruns as depicted in Table 6.1 (Whittaker, 1999).

Table 6.1: Project manager failing factors

Ranking	Factor
1	Risks were not addressed in several areas
2	The project manager did not have the required skills or expertise
3	Project progress was not monitored and corrective action was not initiated
4	The experience, authority and stature of the project manager were inconsistent with the nature, scope and risks of the project

The components of the new methodology offer different tools and techniques, and approaches to address the identified factors in the KPMG survey. The elements in this first part of the chapter altogether deals with these concerns and proposes solutions that were tested in the UAE project and GCC countries and were later confirmed by experts and practitioners in the field.

PROMOTE requires that project managers must be selected early enough so they clearly understand the project's purpose and objectives, have ownership of the project, and committed to success. It is important to emphasise that project managers need to heed that their role is to manage and control and not get involved in doing the work themselves, as they can easily be dragged into this. The UAE project manager situation was an example of such mix ups in roles (see submission two for details).

A project manager needs to have the ability to switch between a macro and micro view of activities. He or she must be able to focus down on small, significant details, while retaining an understanding of how they fit into the big picture (Lake, 1997).

Since national ID programmes have normally several associated sub projects, project leaders were required to be responsible for each sub group and report to the project manager, who should have the overall responsibility.

The *Responsibility assignment Matrix* recorded who or which department was responsible for which project components. Initial work negotiation was the

process by which the project management office obtained the initial commitment of resources for the project. The purpose was to assure clear responsibility for completing all components of the project and to obtain the initial commitment of resources for the project.

Project managers were viewed to be responsible for:

- Providing reports on progress against their schedule
- Requesting approval for items exceeding delegated authority
- Anticipating problems and preparing strategies for solving them
- Negotiating for staff with division head or staff supervisors or project directors.
- Showing expenditure against budget
- Liaising at all levels

A common view among all interviewed officials was that project managers were required to possess a set of skills to encourage and lead their project team to succeed and to create the required level of confidence in the project team. The literature identifies a number of critical project management skills that were taken into account during the selection process for project managers and team leaders. Appendix C lists these skills.

This research also identified specific areas of expertise that need to be addressed by management in the government sector. A key finding from this research is that there is a fundamental need for government agencies and departments professional development activities to ensure that employees and management alike have the required skills and knowledge to manage the technology projects they have responsibilities for.

It was noted that the level of skill and knowledge of senior managers responsible for ID projects was insufficient to comprehend the project deliverables and benchmark them against the stated objectives of the project. It was an agreed view among the interviewed officials that government organisations need to develop a range of skills and expertise in their staff that will allow them to comprehend work activities and work closely with IT suppliers.

Similar to UAE, many of the officials in other countries stated that deep-seated technical expertise is provided by private sector organisations. However, many others noted that government organisations must retain at least some core skills in order to effectively manage complex technology programmes such as national

ID schemes. Where these core skills may not be detailed technology skills, they do involve the ability to recognise how to make better use of technology and technical resources.

It should be stressed that a range of business skills is also needed to manage new technological programmes at all levels of an organisation. Feeny and Willocks (1998) identified nine clusters of core skills that an organisation must develop and retain within its staff that are viewed to be vital for large IT projects. These skills are depicted in Table 6.2.

Table 6.2: Core skills required for large scale IT project management

Leadership	business systems thinking	relationship building
architecture planning	making technology work	informed buying
contract facilitation	contract monitoring	vendor development

While many of the GCC government organisations primarily sought the private sector, particularly overseas companies, to implement their ID projects, a number of senior managers expressed the view that there is a need for individuals within the organisations to perform the host of activities that are crucial to the success of the technology endeavour, and the full exploitation of new technology to deliver business needs.

Many of the officials expressed the view that there was a core level of skills that must be retained and developed within the organisations responsible for the implementation of ID programmes. These core skills included:

- overall management of the ID programmes and the associated business changes
- development of the business cases to identify the business benefits that underpin the need for the programme
- understanding of the business model and development and design of consistent business processes;
- management of business risks and the delivery of business benefits
- management of new commercial contracts and procurement

Many of the interviewed officials stated that their organisations needed to understand the importance of these core skills and to raise the level, status and career values of posts requiring these skills. They also indicated that government

organisations do not normally recognise the importance of these skills and do not provide incentives or rewards for people who stay in or take up these posts.

Existing mechanisms to attract and retain IT/IS skills are inadequate and are hampered by the significant pay differentials that exist between the government and private sector in this field. Rapid progress in this area is undoubtedly needed.

6.1.5 Project Manager's Doctor (neutral mentor)

The role of the project manager is one of great responsibilities. The project manager assumes many duties in the project of directing, supervising and controlling the project from beginning to end. Even if the project manager possessed all the skills discussed above, they will still go through stress and pain at different times in the project. This may in itself be considered as a threat to the project and arguably viewed as an early symptom of ailing projects due to the criticality of their role.

This stress is usually caused due to the severe pressure and expectation put on them, as well as the many hats they are required to wear in the project. As a result, many project managers lose motivation and struggle to gather momentum to conduct their work with the same efficiency and effectiveness they used to be at an early stage of the project as noted both in the UAE project and those in GCC countries.

It is one the main recommendations of this study that project managers have neutral mentors appointed for them. Clutterbuck & Megginson (1999) defines mentoring as an *"off-line help by one person to another in making significant transitions in knowledge, work or thinking."*

The project management literature uses the term 'mentor' and 'coach' to describe the individual who assists the project manager or the project team, either formally or informally, in various tasks related to the management of the latter's responsibilities and the attainment of a broader view of direction and advancement (Flannes & Levin, 2001). This assistance may take the form of guidance and encouragement and may or may not be directly tied to an actual project issue being faced by the individual being assisted (ibid).

Mentoring focuses on internal knowledge transfer and Coaching on accelerated, personal development (Carson, 2003). Both concepts can be implemented hand-in-hand, hence creating real value quickly in a fast-paced market environment (Whitworth et al, 1998; Rosinski, 2003).

Reiss (1996) points out that many very capable managers find establishing and running programmes and projects to be a critical transition from their normal roles. New procedures demanded by governance directives plus unfamiliar tools and techniques, are often faced during the critical programme initiation phase of the programme life cycle, and that many organisations under-estimate the size of these challenges (ibid.).

Popper and Lipshitz (1992) suggest that coaching involves not merely a focus on 'skills and competencies in action', but also on 'psycho-social' aspects via which focusing upon skills and competencies in action might be more productive:

> "Coaching has two components: (1) improving of performance at the skill level; and (2) establishing relations allowing a coach to enhance his trainee's psychological development." (Popper and Lipshitz, 1992)

The existing literature touches this subject and narrows this down to professional growth and personal development plans (see for example: Hendricks, 1996). Besides, the mentor in the project management literature refers to a senior individual from within the organisation who offers advice on career path as well as individual project management problems.

It is recommended in this study that the neutral mentor be an independent individual and preferably outside the organisation. People feel normally more comfortable talking to people outside their work boundaries. Though the appointment was informal in the UAE study, it is recommended that the neutral mentor be formally appointed by the project owner.

There are different roles a mentor may assume. The precise role will vary according to the experience and needs of the project manager. A discussion and agreement on their relationship need is important to be achieved at an early stage of the project. Among the critical roles the mentor is required to play is as a guide, counsellor, motivator, advisor, and door opener.

The mentor's primary role evolves around understanding the psychological and emotional obstacles that the project manager may face during his involvement in the project and tries to resolve them.

Among the suggested roles of the neutral mentor are (PMI, 2006):

- provides coaching and advice on setting meaningful goals/objectives;
- door opener; increase the project managers social interaction and networking with others at work or personal life;
- places project managers on a more balanced emotional path, facilitating the growing pains, life's highs and lows. It's easier to live with change when one has a more even-keeled approach and perspective;
- contributes towards the improvement of career and life satisfaction, seeing them through their struggles, and cheering them when they accomplish their goals;
- Counselling on work and personal habits, encouraging and supporting change behaviour.

Kram (1983) emphasises that the mentoring relationship should be a dynamic one, which changes over time as the relationship matures and as the mentee's experience and expertise develops. She adds that:

> "At certain points [mentoring] might include elements of coaching and counselling but the relationship is individual, depending as much on the personal characteristics of mentor and protégé as on any predetermined notions of the nature of the relationship." (Kram, 1983)

In addition to his executive role in the project, the author played the neutral mentor role for the project manager as well as for many other project members. Listening and playing guiding and motivator roles proved to have profound positive effect on their performance.

Statistics on the turnover of project managers during a project have not been found, but anecdotal evidence suggest that it is not unusual, especially on large public projects. The consequences of high turnover can seriously compromise a project. If a mentor can reduce this possibility, then they have made a significant contribution to the well being of the project.

6.1.6 Planning, Communicating, and Performance Management

"If you don't know where you're going, you may end up somewhere else."

- Casey Stengel

The ability to think ahead and anticipate can make the difference between achieving project objectives or not. The project manager must be prepared to change the project plans in a flexible and responsive ways, and it is unlikely that the original plan will be the one to follow all the way since requirements and circumstances generally change as the project progresses (see also submission one).

This would mean a regular re-evaluation of the plan and making the necessary changes accordingly. If the project is to succeed, it must be anticipated, change need to be recognised and implemented, and its impact must be measured effectively.

Many of the organisations involved with the research tend to think that by pushing for an aggressive schedule, it would accelerate the work and complete the project sooner, which was never true in any of those projects. When faced with an unrealistic schedule, development teams often behave irrationally.

They race through the requirements, produce a superficial design, and rush into coding, leading to what the author calls 'a not what I asked for' system. The bottom line that organisations need to heed for is that when pushing for unrealistic schedules, the project either will be late in delivering a working product or will produce a product that does not work.

In the UAE project, all project teams were involved in the planning process to maximise their buy-in, ownership, and thereby accountability. This served two purposes, it informed people what is happening, and it obtained essential support, agreement, and commitment (not excluding the sponsor).

Senior management treated the schedule as an accurate forecast of how the project is going to go, and they seemed to be questioning every time the schedule was updated. For this reason, the schedule was a very powerful tool for commitment management. See also section 6.1.9 where further discussion is provided on the importance of planning and communication of such plans.

Another aspect to heed in planning is that large projects such as ID schemes are normally under increasing pressure to achieve more tasks with fewer resources and balance different variables such as available staff, workload volume and complexity, the working environment including tools, architecture and geographical extent. For a project to run smoothly, the resources required must be available at the time they are required.

This demands an effective front-end planning, taking into account not only people resources, but also facilities, equipment, and materials. A detailed and complete plan guides the project and it is the document that communicates the overall objectives, activities, resource requirements, responsibility assignments, cost and time schedules.

It is also vital to keep everyone involved fully informed of the plan and update it whenever it changes. This is important to keep project members on the same page and avoid a mad scramble when deadlines approach.

Though the project plan will be the basis, project performance must be sensed. This is where performance observation comes into the play. Performance observation is the receipt of sufficient information about the project to make an intelligent comparison of planned and actual performance.

Information on project performance can come from many sources, both formal and informal. Formal sources include reports, briefings, participation in review meetings, letters, emails, memos, and audit reports. Informal sources include casual conversations and observations.

In addition, and taking into consideration the nature of large IT projects, independent project review (IPR) should take place at different stages of the project lifecycle to assess objectively the degree to which the project is being managed according to the project management methodology's processes and procedures, and how the project is performing in relation to the project's baseline in terms of the agreed scope, cost, time and quality objectives. This proved a very effective approach to monitoring the UAE project performance.

Monitoring and control are key activities for effective and efficient operation of the control cycle. Henri Fayol stresses that to control means seeing everything in conformity with established command. Control is a fact finding remedial action process to facilitate meeting the project purposes.

In its simplest form, a project control system can be represented by a feedback system. The system has inputs, outputs, and a process for transforming those inputs to outputs, together with a feedback loop, which corrects deviations of outputs and references. The correction will adjust the process parameters to provide correct outputs.

In the real world and what was realised in the UAE and the GCC projects, that project mangers needed to monitor project progress on a weekly basis; and if a problem occurs, the progress must be monitored more regularly. If the problem becomes serious enough, the monitoring rate might increase. Once the problem has been solved, the monitoring may revert to the usual weekly sessions.

Comparing performance against the plan was found difficult when the work could not be quantified. It was imperative that substantial work was made to derive key performance indicators (KPIs) for the project. Assessing progress when work is not easily quantifiable will indeed limit the ability to achieve project management control.

It is for this reason, the UAE project work was broken into smaller chunks of work so that progress can be monitored fairly frequently. Tangible deliverables were used as sign posts to show progress. For example, written functional specifications were an evidence that work was complete.

Looking at this from a more global perspective, the project charter was used to set out the ways in which scope, schedule, cost, quality, staffing, processes, communications, risk and procurement were managed. It also included the project objectives, assumptions, organisation, procedures, review/approval gates potential risks, the work breakdown structure, network diagram, schedule, the budget and human and physical resources. The level of detail will vary according to the characteristics of each project but each area should be explicitly considered to allow a better management of performance.

6.1.7 Risk Management

Another important aspect to control is risk management. Some of the officials interviewed reported that the application of risk management in their ID programmes had a narrow focus looking only at the inward-facing project risks

that are tangible and within the project manager's control, without considering risks to the organisation's business as a whole.

It was also noted both in the UAE project and the GCC countries that there was too much reliance on tabulating numerous risks in a register without prioritising them or considering the extent to which they may be correlated with each other. One of the key issues that this research came across in the UAE and in other GCC countries was that there was little understanding of what risk could or should be transferred to the suppliers.

Many of the officials recognised that because of lack of project management expertise within the government organisations, their organisations often fail to understand or define the boundary between the responsibilities of the supplier and the retained responsibility within the purchasing organisation.

There was often a reliance on the contract and its penalty clauses to mitigate risks rather than taking actions or forming effective contingency plans. Even when risks were identified and mitigating actions were formulated, many of the senior management felt that there was insufficient expertise to monitor the effectiveness of mitigating actions and contingency plans or to refer risks to an appropriate level within the organisation in a timely fashion.

It was learned from the UAE project that focusing on delivering benefits requires awareness of the potential risks to the business. There is a need in organisations for risk analysis to identify all risk, the likely impact on the project and the probability of the impact occurring. The combination of impact and probability should then be compared against the project's tolerance for cost, time and functionality.

For all risks that fall outside the project's tolerance, either mitigating for contingency actions (or, particularly for high impact risks), both must be identified. In the case of mitigating actions these must be included in the project plan and monitored in the normal way. In the case of contingency actions, testing to ensure the feasibility of the contingency action must be included in the project plan and, in addition, the resources to provide the contingency must be reserved.

6.1.8 Development of Skills, Knowledge and training programmes

> "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." **Chinese Proverb**

One of the key themes that emerged through the implementation of the UAE project and experiences reported by the interviewed officials, revolves around the need to develop the skills and the expertise of personnel working in government organisations. Many officials complained that the levels of skill and expertise to manage complex programmes such as ID projects was lacking in their organisations.

This research finding emphasises that there is a critical need to improve skills and knowledge of personnel in government organisations both from management and technical perspectives to increase the success chances of large scale technology endeavours, and is particularly crucial for ID projects due to their nature, size and complexity.

Certainly, the significance and value of training has long been recognised in the management and IT literature as an important means to improving employees' skills and broaden their knowledge horizons. The need for training was acknowledged by the officials where their perceptions were that government agencies must support training opportunities to raise the skills of their staff, yet some of the officials noted that this is a frequently underemphasised or ignored subject in their organisations.

From a technical perspective, many of the officials reported that it was not always possible to utilise the full capabilities of some technologies because of the lack of knowledge and training. Others expressed views that some staff are often reluctant to adapt to new systems because they have not been provided with adequate training resulting in either those systems not being used at all or are not used to their full capacity.

In fact, training was a very important aspect in the UAE project, to increase staff satisfaction and their perception of the system. A further discussion is provided on the importance of user training in chapter 7, when the author discusses the measures he used to assess and evaluate the success of the UAE programme.

Undoubtedly, governments undertaking complex IT projects such as ID programmes are initiated to provide technical capability and knowledge lacking in the existing environment e.g., new secure means to authenticate individuals, better coordination of government services through connected databases using unique identifiers (i.e., id number), enabling of e-government applications, etc.

Failing to assess training requirements and planning training programmes, is likely to lead to gaps in knowledge and to an inability of the organisation to optimise the usage of the capability offered by the new technology.

Hussain (2004) goes beyond these specific system training programmes and suggests that there needs to be a commitment to development and learning at all levels of the organisation. This needs to extend beyond the realm of job related training and development or be aimed at specific organisational initiatives. This requires establishing an environment in which individuals are encouraged to plan their own requirements for ongoing development.

While detailed technology expertise may be provided by the private sector, there was a common agreement among the participants that there is still a need for government organisations to develop and retain skills and expertise around the following:

- Business skills to manage new technology programmes at all levels of an organisation
- Management and leadership
- Contract and supplier management
- Project and programme management
- Manage business risks and the delivery of business benefits
- Understanding of the business context and optimising business processes

Government organisations need to heed that the cornerstone for the success of IT projects is not about joined up government or technologies but the people and processes behind them. Indeed, ensuring that organisations have the right personnel to support their business both from technical and management perspective will determine how successful any project or organisation will be.

6.1.9 Learning Lessons and Transfer of Knowledge

The findings from this research have suggested that there needs to be a greater emphasis on transfer of knowledge from governments who have either implemented or in the process of implementing ID projects. Lessons from successful implementation projects need to be learned and transferred to similar initiatives.

PROMOTE methodology identifies a process of closure, evaluation and lessons learned documentation. It states that a system should be established to retrieve these lessons learned so that the knowledge from a project can be obtained and transferred.

Many of the officials in the countries visited complained that they did not have access to information about how ID programmes have been managed in other countries e.g., what types of issues and problems they encountered and the solution found. One official stated that 'it is as if we are continuously re-inventing the wheel in large government projects such as the ID project'.

This is a statement that the author very much accepts as a fact. Through active participation in more than 40 conferences in the last 5 years representatives of many governments were observed to discuss and present superficial information about their projects.

The data presented about ID projects from different countries was almost the same. The only observed difference was the statistics provided about enrolment, system capacity, etc.

Many officials and experts complained that management of ID projects is a complex, difficult and risky process. Obtaining help and advice from those countries that have gone through similar experiences would support other initiatives greatly. This is argued to pave the way to developing better approaches to managing such projects that are adaptable and malleable as lessons learnt are captured from similar implementations around the world.

Although different countries may be trying to achieve different objectives with their ID programmes, many of the processes will be common to all e.g., project management, technology components, etc. Therefore, there is plenty of scope for sharing experiences. Nonetheless, it could also be argued that all the programmes from different countries will provide a security chain around their regions, and that this chain may only be as strong as the weakest link in it.

In this study, several factors were identified as key consideration areas that ID projects need to take account of.. The issues outlined in the next section are likely to be faced in similar initiatives, and they should allow for better comprehension, and encourage this pool of knowledge to grow.

6.2 Critical Success Factors

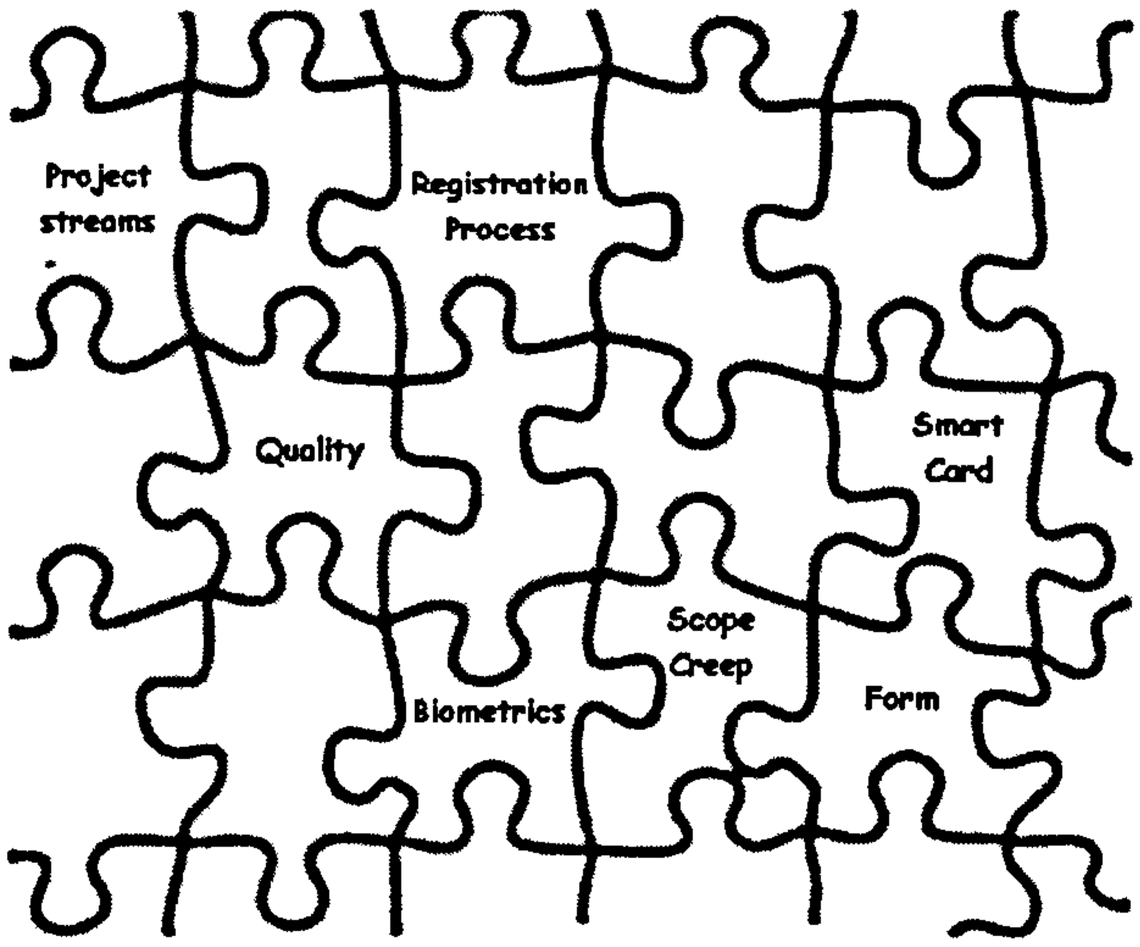


Figure 6.3: Critical success factors for national ID programmes

This section provides a review of some important areas identified during the research study that particularly relate to national ID card projects.. They need to be given serious consideration, and are considered as the key critical success factors.

They have been partly derived from the literature but more importantly from personal experience and from the views of the experts interviewed. These are summarised here from the deeper analysis and appraisal conducted in the supporting submissions.

The first area addressed here revolves around business process improvement and the overall planning and strategy to improve public acceptance. They have a significant impact on the project progress and efficiency of performance and subsequently on the overall success of such schemes.

If underestimated, the elements identified have the potential to threaten project performance and may become *project killers*. In the review of national ID programmes in other countries around the world conducted, governments still have scattered views on how these elements need to be organised and implemented. The identified areas are considered to be crucial outcomes from the project implementation that the project management methodology itself can not address, but can highlight.

6.2.1 The Registration Process

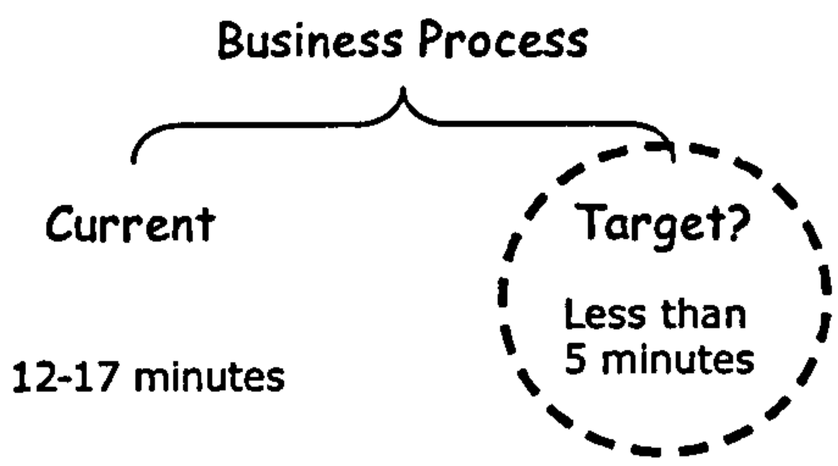


Figure 6.4: Ideal registration process

In the post implementation review of the registration process, it was important to reengineer and improve some business processes to reduce the total enrolment time. The review exercise revealed that the average enrolment process could be completed in less than 5 minutes rather than the required 17 minutes without any big impact on the project objectives if only two enrolment activities were re-engineered: (1) the registration form and (2) the number of captured biometrics.

6.2.1.1 Registration Form

The registration form throughout the project life cycle went through many iterations in an attempt to reduce the amount of data needed for the enrolment. It started with an 8-page document, and was reduced to 6, and then to 4 pages. The form which was a pre-requisite to initiate the registration process was viewed as:

- too lengthy
- required considerable time to fill
- some required information was not readily available

- was sometimes filled incorrectly
- did not address the majority of population as large number of resident applicants were illiterate
- considered to be the enrolment bottle neck

The reason for its design and the large amount of data required was to achieve the objective of producing statistics about the population of the country. The review process indicated that there was a vision mix-up between the two requirements of building a statistical database and the other objective of enrolling the whole population of the UAE and producing ID cards for them.

This was a clear confusion among many members and stakeholders for the project to aim to achieve these two objectives at the same time. The recommendation from the review exercise was that the implementation of the project must take place in three stages as depicted in Figure 6.5. In the first stage, the project must attempt to enrol the population for the new ID card with a minimal set of data as depicted in Figure 6.6 below.

With this, a key objective of maintaining a single record for individuals is still achieved in which captured information are linked to a number which is also linked to the person's biological features. Thus, as only primary identification data will be required for first time enrolees, the application form was suggested to be eliminated and rather make use of the existing electronic link with the Ministry of Interior's database to obtain and verify data.

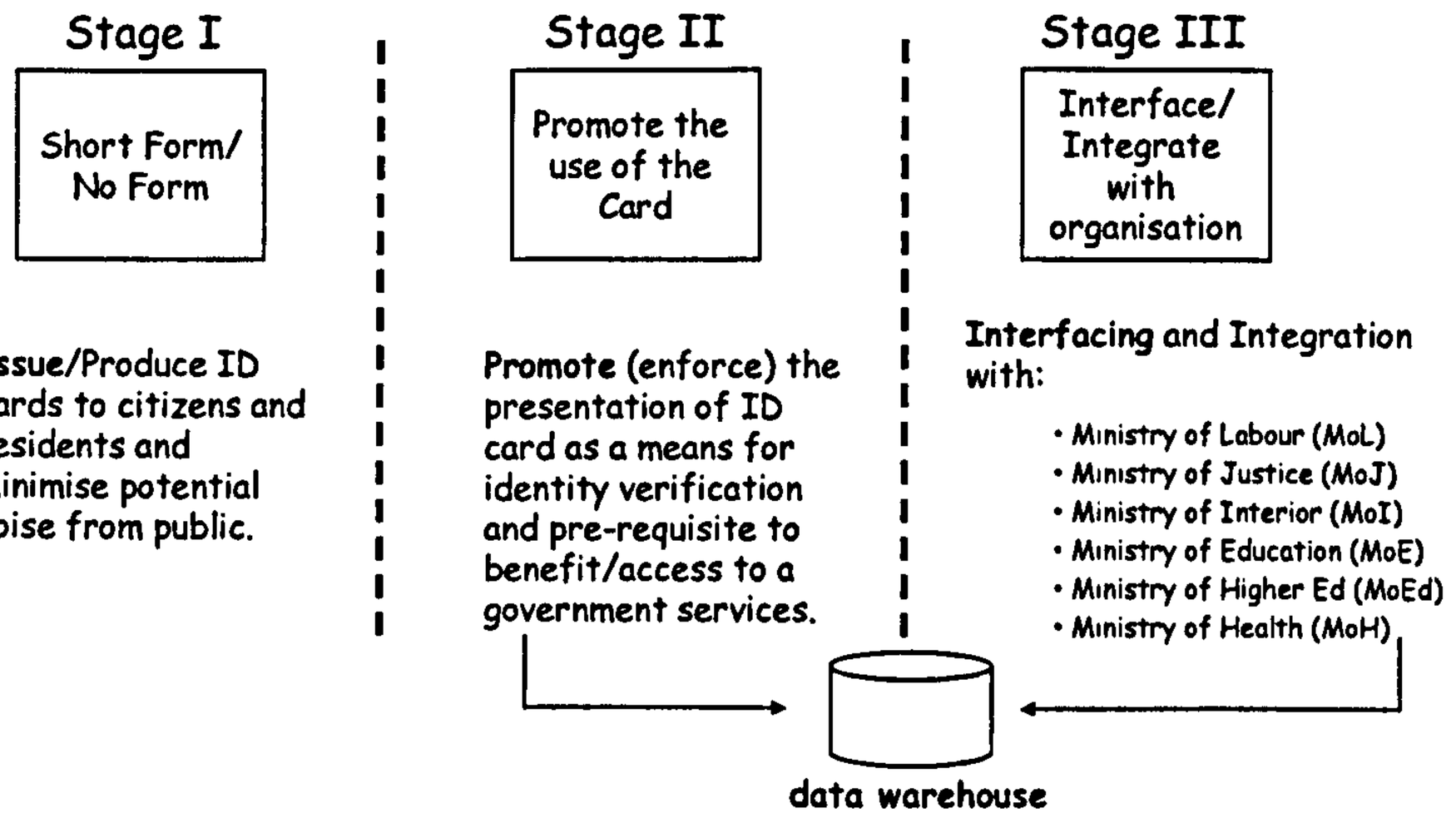


Figure 6.5: Project implementation stages

Names	Name (Segmented) Gender, DoB, Marital St.	Name Gender, DoB, Martial St.
Passport	Nationality Passport No, Place of issue, Issue and Expiry dates Unified No Family ID, Book No	Nationality Passport No, Place of issue, Issue and Expiry dates Unified No, Sponsor Name Residency File No, Issue and Expiry dates
Address	Emirate City Mobile phone	Emirate City Mobile phone

Figure 6.6: Primary identification data captured for first enrolment

Then stage two and three must run in parallel. In stage two, efforts must be directed towards promoting (and enforcing) the presentation of the new ID card for identity verification and as a pre-requisite to the most often visited government services by the population. Those service organisations then need to maintain the new ID numbers in their databases, which should be used when moving to stage three of the strategy which requires the national ID database to interface and integrate with such databases.

Provided the link is in place, a proper data warehouse can be built that is up-to-date and more reliable for generating statistical reporting purposes as it will obtain information from the primary (trusted) sources.

6.2.1.2 Biometrics captured

The enrolment process in the UAE required the capturing of all fingerprints (i.e., slaps, rolled prints, palm, writer's palms) a process taking around 6 to 10 minutes to complete. On the system level, only rolled fingerprints were used for identification, where slaps and palms were stored for criminal search by the Ministry of Interior.

It is suggested to only capture the flat prints and use smaller acquisition devices (just the slaps and the two thumbs), and to capture other fingerprints at a later stage only if needed. It was recommended that a second biometric must be

introduced to complement the fingerprint biometric and enhance the FTE[8], FAR[9], FRR[10] rates. The second biometric was recommended to be more of a real time application that could be used in mass population areas such as airports. Both biometrics were seen as easy to operate and will cut processing time to less than 2 minutes.

6.2.1.3 Biometrics quality

Shortly after the introduction of the pilot phase of the programme it became abundantly clear that the quality of fingerprints taken by operators will have a determining effect on the classification, identification, and authentication of applicants. Apart from possible shortcoming in the operating system itself the percentages of failure to enrol (FTE), false rejection rate (FRR), and false acceptance rate (FAR) may increase dramatically if operators are not properly trained in the art of taking fingerprints.

Failure to enrol due to operator failure may result in false demographic information. The lesson learnt therefore was that a very high premium should be placed on a comprehensive operator training programme. It was also realised that results of biometric hits should be closely monitored to determine the performance of the system in terms of the quality of these results.

A clear indication of unacceptable system performance would be if a too long hit[11] list of potential candidates (biometric records) is brought up by the system that subsequently requires human intervention to identify hits or if the real hit (candidate) constantly appears very low on this long hit list. While it can be

---

[8] Failure to Enroll: when the system fails to enroll an applicant largely due the poor quality of the biometrics being captured.

[9] False Acceptance Rate(also referred to as False Match Rate and Type II Error): is an incorrect identification or failure to reject an imposter (Imposter: is a person trying to submit a biometric in either an intentional or inadvertent attempt to pass him/herself off as another person who is an enrollee).

[10] False Reject Rate (also referred to as False Non-Match Rate and Type I Error): is the failure to identify or verify a person.

[11] For biometric identification applications, the provided biometric is compared against all entries in the database (1:N search) and should result in only one successful match (referred to as a hit) to result in positive identification.

argued that the hit list can be shortened by tuning the applicable threshold, it will then mean that real hits that appear low on the hit list will not be identified if the systems performance is not improved.

There is obviously a very close relationship between the quality of fingerprints taken and the performance of the system. It was however realised that the introduction of a second biometric will complement the fingerprint biometric and will basically balance any shortcoming (see also for example: Danielyan, 2004).

The re-engineering of the above two enrolment processes provided a saving in the office space, equipment and staff required for enrolment as the original enrolment process was divided into three stages as depicted in Figure 6.7. The reason for the three office design was mainly to segregate duties, and manage the daily in-flow of applicants and shorten the waiting time.

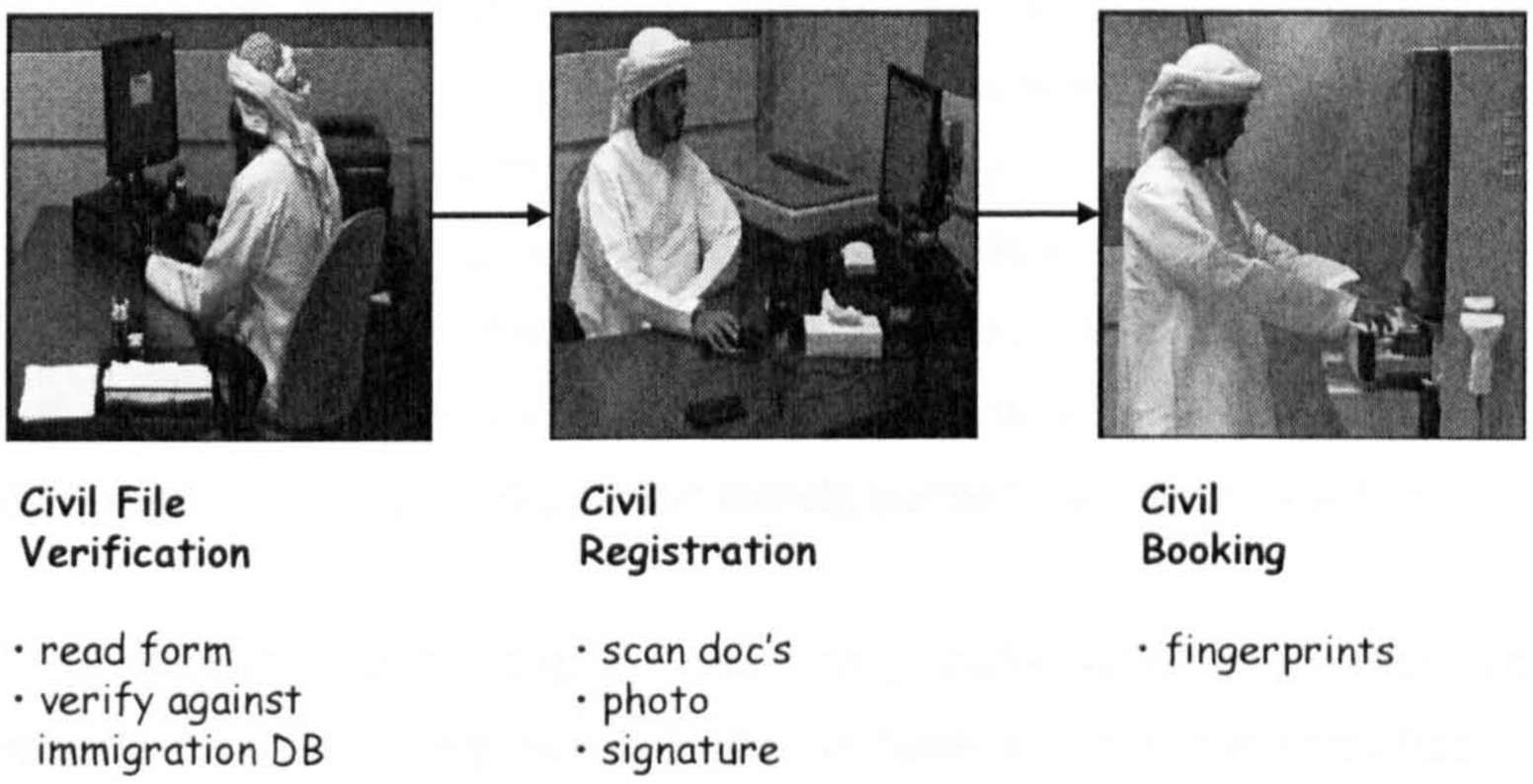


Figure 6.7: Registration procedures

It is strongly recommended for national ID projects to consider performing the enrolment process through a single workstation. This is seen to significantly enhance the enrolment strategy, in which smaller devices can be used to carry out the registration, and enhance the portability of the system for wider deployment in places such as setting up permanent and temporary registration offices in traffic departments, immigration, municipalities, schools, companies with a large number of staff members, etc.

6.2.2 Scope Creep

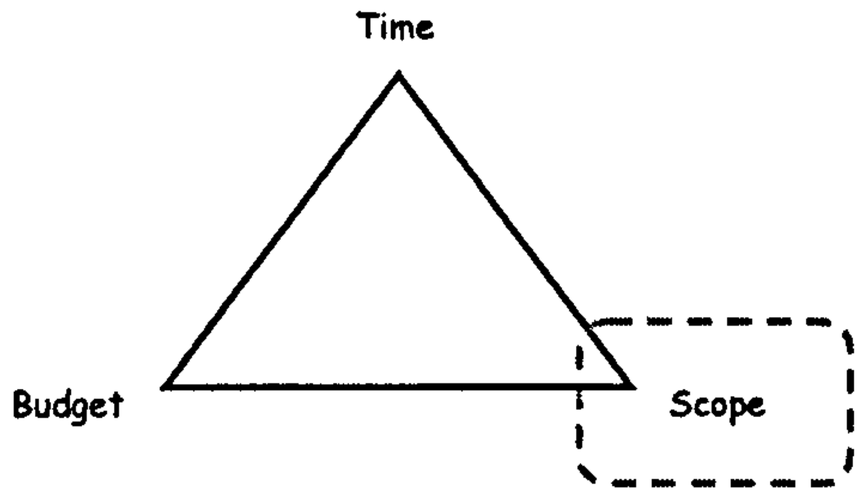


Figure 6.8: Project triple constraints

Scope creep is a term used to describe the process by which users discover and introduce new requirements that are not part of the initial planning and scope of the project. As widely quoted in the literature, many doubt whether an initial limited and specified scope for national ID programmes can be maintained, as the nature and high cost of such projects are likely to yield and encourage the expansion of its functions (Clarke, 1992; Clarke, 1994; Fontana, 2003; Froomkin, 2002). In IT projects, it is common that management and end users often do not know what they want from such systems, and what is often worse, is that they think they know and then change their minds partway through the job.

Since the IT system, business processes and people issues are linked, there are doubts whether it is actually possible to produce a complete specification for a large IT project, that is not likely to require amendment as new information comes to light, or as new priorities emerge. The project management literature also indicates that coping with changes and changing priorities are the most important single problem facing the project management function (Heerkens, 2005; Meredith & Mantel, 2003; Reiss, 1995). Indeed, changing targets all the time, would obviously take any project nowhere.

In the UAE ID programme, project performance was monitored and measured regularly to identify variances from the project plan. It was supported with a formal and well-defined process to control and manage the changes being requested to the project scope and objectives during the project lifecycle. See for example Figure 6.3 that depicts an example of one of the change control policies.

Table 6.3: Change Control Authorities

Authorised body / Types of Change	Technical nature (No financial impact)	Technical nature (With financial impact)	Contract Scope (No financial impact)	Contract scope (Financial Impact)
Steering Committee	Accept or Reject	Analyse and Recommend	Accept or Reject	Analyse and Recommend
Change Control Board		Reject or Recommend to Project Sponsor		Reject or Recommend to Project Sponsor
Project Sponsor		Approve or Reject		Approve or Reject

In light of the inflexible vendor development methodology, the scope changes introduced and processed towards the end of the project caused slippages in the project schedule. It was common during the different implementation stages of the programme to change the scope to either add new or change agreed functions, which obviously had severe impact on the implementation project plan and budget.

Examples of such changes included the shifting from centralised card printing to decentralised, upgrading the card technology, changing card design and displayed data, upgrading database technology, etc. The change control procedures put in place played a major role in overcoming these changes and reducing their impact.

Another example of such changes to project scope was related to the perception of the multi-purpose functionality. Several attempts were made from certain key stakeholders of the project to expand the card applications during the execution phase that would have had severe impact on the project progress. It took some time for them to realise the importance of limiting the purpose of the card as an identity document in the first phase of the project and that efforts must rather be concentrated on the enrolment of the population and the issuance of the new ID card.

Indeed, a multi-purpose card was one of the objectives of the project, but not in the way it was comprehended. The Multi-purpose term stated in the objectives was used to explain that the card can replace other identity documents when it comes to the verification of identities. Since the card was obligatory to the total population of the UAE, the provision was that the new ID card can replace such cards if the other entities use the new ID number in their databases as a primary number to retrieve individual records.

The management of scope in the UAE ID card was clearly one of the biggest challenges that required the project core team to spend a lot of time and effort to clarify the feasibility of such actions to the upper management. Finding the right communication approach was key to managing scope creep.

6.2.3 Developing a modular approach to delivery: *Thinking Kaizen*[12]

While large IT projects tend to take a long time to implement, potential supporters often have short attention spans or are distracted by other issues. It is often tempting to give highest priority to projects that can be implemented within a political cycle (Mechling and Applegate, 2001).

Whenever possible, it is important to break larger projects into smaller ones with short time-frames and visible and motivating deliverables. Large IT projects can be divided into smaller parts (through small but quick steps) that begin to deliver value immediately, which helps sustained stakeholder commitment and to follow-on opportunities. These small building block projects should have a demonstrated benefit in the short term while also advancing progress toward accomplishing long-term objectives.

Not every step in this process will produce the transformational outcomes, but every move can be a valuable step in the learning process (Chawla and John, 1995). And, the cumulative impact of these small steps, if undertaken as part of a larger vision, can be truly revolutionary (Mechling and Applegate, 2001).

The experience gained during this research study showed the need for governments embarking on large IT projects such national ID schemes, to adopt a modular approach that allows large programmes to be broken down into smaller discrete deliverables with defined activities and identified benefits.

In the UAE case study, though introduced at later stages of the project, the modular approach allowed the project to demonstrate 'quick wins' which facilitated early release of the functionality into the organisation and kept the project teams and senior management motivated.

[12] Originally defined in Massaki Imai's book ***Kaizen*: The Key to Japan's Competitive Success**, *kaizen* refers to a process of continuous improvement through small sustainable steps, or "bursts" of activity.

This approach required that the overall goal of the project was clearly identified and understood and that each interim technology delivery moved the project towards that goal. Due to the nature of ID projects, the phases were long. This was one of the most quoted problems by officials in the GCC countries; i.e., demonstration of capabilities and services in long timeframes from the time of initiating the project.

This research study suggests that adopting an incremental approach is particularly valuable where some of the requirements are likely to change due to environmental factors such as legislative or policy change, or improvement opportunities in business process or technology.

The initial incremental delivery could constitute the requirements that are most certain, and then once the delivery of that increment is under way, the organisation can re-evaluate its other requirements. This is likely to prove to be more efficient than trying to specify a module based on uncertain requirements, then making extensive use of change control procedures once development is under way.

The UAE project demonstrated how a waterfall development approach negatively impacted the project in the beginning, and that it was only when the vendor started to accept a change to its development and implementation methodology, the project wheel got running. The approach followed by the vendor demonstrated its weaknesses in its inability in responding to rapidly changing requirements because of the surrounding business environment. This subject was discussed in detail in submission two.

This research study supports the premise that if a large programme of work is broken down into smaller components, or modules, the subsequent delivery of these smaller components will:

- be easier to manage and specify;
- be simpler to implement;
- offer more options for contingency;
- be more likely to accommodate changes in technology, or in the political or financial environment; and
- offer more decision points to allow greater control of the work.

These factors make each component of the overall IT project implementation more likely to succeed. As a result, there is more chance that the overall

objectives of the whole IT programme will be met than would be the case if a monolithic approach was taken.

An IT project has a higher probability of success if, rather than aiming to develop and supply the complete range of business support functions required, smaller projects are designed to deliver those strands that can be separated out into single modules.

This does not mean that the detail of each module has to be determined at the start. What is needed, is a clear overall goal and a mechanism for determining the content of each of the modules and how they will fit together.

Additionally, a modular approach will allow supplier organisations, to adopt an approach that allows trial and pilot implementations to enhance the users perceptions of the new IT before implementing it on a full scale basis. It may be possible for the rollout of the piloted system to be carried out in phases. This allows changes to be made that reflect the experiences of small groups of users.

Such an approach will increase eventual acceptance of the system by users. This is likely to reduce the overwhelming effect of the technology that the new user might experience and should also increase the user's exposure to the technology, and consequently improving acceptance rates.

A modular approach in large IT projects and ID project in particular is a risk minimisation strategy. The cost of this strategy lies in two areas:

- the initial consideration of the best approach to modular or incremental delivery will use management time. For an organisation embarking on a major change programme, it needs to ensure that it has the right skills and experience to make this assessment.
- there is some potential to delay the delivery of business benefits, which will be offset by the potential to deliver a sub-set of the business benefits earlier.

The IT project to support business change is normally prioritised to gain the maximum benefits at the earliest opportunity. However, this tactic should be balanced against the risks. It may be beneficial in some cases to deliver some low-risk technology early in order to familiarise the organisation and its suppliers with IT project delivery, then to take on higher-risk projects when some experience has been gained.

6.2.4 Supplier relationship management

Arrow (1962) suggests that in terms of knowledge and information, there is an inherent asymmetry between the seller, who knows what they are selling, and the buyer, who, to some degree, must remain ignorant of what is being purchased. As noted from the UAE case study, and the feedback from the GCC officials, the buyer is particularly disadvantaged especially in the case of large IT projects, in that usually the organisation is less experienced and knowledgeable particularly in the core proprietary technology being acquired.

The overall technological and information weaknesses of the buying authority limit the search among possible technology suppliers, and consequently their choice of suppliers. Thus, the buyer's ability to undertake direct technology transfers is often limited, and the transfer has to be undertaken through an intermediary who packages the elements of required technology – often referred to as system integrators (ibid). The situations is further aggravated because there tends to be little experience in the public sector organisations required to manage suppliers properly and to ensure that any systems procured meet the business needs (Moore, 2001).

There was a common view among the interviewed officials that one of the major factors in achieving success in the implementation of complex IT projects such as national ID schemes is effective communication between the client and the supplier. Officials suggested that shared understanding of user requirements and the business needs is critical to ensuring that appropriate technology is procured and that it can contribute to the design quality of the technology solution.

Agreeing with the literature, it is also one of this research study arguments that it is an inadequate attention to requirements that leads to failure. There are two aspects of this. Of course in large government IT projects, and over the lifetime of such long-running projects, the requirements will change.

Perhaps more significantly, the initial requirements will also "change" in the sense that, as they become more fully understood on the part of both supplier and client organisation, it is increasingly realised that the initial agreement was based on "weak" mutual understanding. What was perceived as an agreement, is now seen as a basis for conflict.

The supplier wants to deliver what they originally undertook to deliver, the client organisation wants that too, but disagrees as to the details of that initial

agreement. The customer now wants something additional however, something more refined or more elaborate that the initially agreed requirements. This puts the customer in a weak position to negotiate a compromise.

Many of the officials also expressed a variety of concerns about IT suppliers' approach to the support of their technology programmes. One of the officials noted that in his experience 'suppliers tend to put in a highly skilled team during the tender evaluation process but tend to substitute weaker personnel after the contract had been awarded'.

Another criticism was that many of the suppliers fail to fully understand the business need behind large IT projects. Consequently, rather than developing and proposing solutions to meet the organisations business needs, many of the suppliers approach appears to push their particular 'off-the-shelf' packages or systems that they have implemented elsewhere.

Official and experts suggested that in order to better manage the implementation of technology programmes, suppliers need to produce realistic plans, including financial, technical, personnel, and communication plans, throughout the lifecycle of the programme to ensure their activities continue to be inline with the business need.

It was also suggested that there needs to be more sharing of information about problems at the earliest opportunity to ensure small issues do not escalate, and an agreement on processes at the start of the programme that will actively encourage cooperation and an open dialogue between the supplier and the client.

This research has shown that public sector organisations, in the UAE and GCC countries in particular, do not necessarily have the skills and expertise to ensure that the suppliers fully understand the business context of large IT projects which normally involves advanced state of art technology acquisition or if the solution proposed will fully meet the business needs of the organisation.

Many of the officials interviewed suggested that the lack of an overall procurement strategy that defines the common mechanism for managing the procurements throughout their lifecycles was seen as a significant problem in managing IT acquisition projects. Research has supported the need to raise the skills and knowledge within the organisation to ensure that these critical procurements are not put at unnecessary risk and deliver value for money.

In IT projects, all parties (i.e., client, supplier, consulting firms, etc.) need to be clear about their responsibilities in relation to all of the key activities at the outset and throughout the project. There needs to be a shared understanding of user requirements and the business needs to ensuring that appropriate technology is procured and that it can contribute to the design quality of the technology solution (Swanson, 1988).

In the UAE project, and despite the fact that it was in the vendor's own interest to work very closely with the client in order to focus on the same goal as a team, it was their view that their responsibility was limited to the development of the system, and not the management of the other project activities. This created a communication gap in the project, as many of the project activities took longer periods to be completed. Submission two provides many examples in this regard.

The vendor in the UAE ID project needed to recognise that the end users group was not only limited to client's staff operating the system, but also the public i.e., the system must be acceptable to public and usable by the end-users (the operator's of the system). In other words, the system was expected to satisfy the functional and technical requirements of the country.

This is an important aspect that needs to be heeded in all large IT projects. Unfortunately, the vendor's view was centric around the concept of 'tell me your requirements, and we will develop it for you'. This resulted in many heated discussions between the client and the vendor especially when the latter was requested to put forward business and technical solutions to certain requirements during the project. To a large extent, the vendor was seen to play a passive role in the project, limiting their involvement and responsibility to the implementation and delivery of the system.

This period of disagreement between the client and the vendor over requirements was minimised when the system was in operation and the project team had the opportunity to do a closer evaluation. The use of software quality metrics has proven to be an effective tool for improving the quality of software and the productivity of the development process.

ISO 9126 quality framework (depicted in Figure 6.9) provided a very useful and supportive methodological approach for going about software quality assessment. It proved to act as a comprehensive analytical tool as it moved beyond superficial evaluation to achieve a more thorough view of the system's strengths and weaknesses than can be provided by less systematic approaches.

Submission 4 provides a detailed application of this framework on the UAE ID project. The feedback received from GCC officials and experts also confirmed the usefulness of this framework in large IT projects, and ID projects in particular. GCC officials indicated that the framework was a good tool for communicating with executives and senior management and to agree on general characteristics of the system.

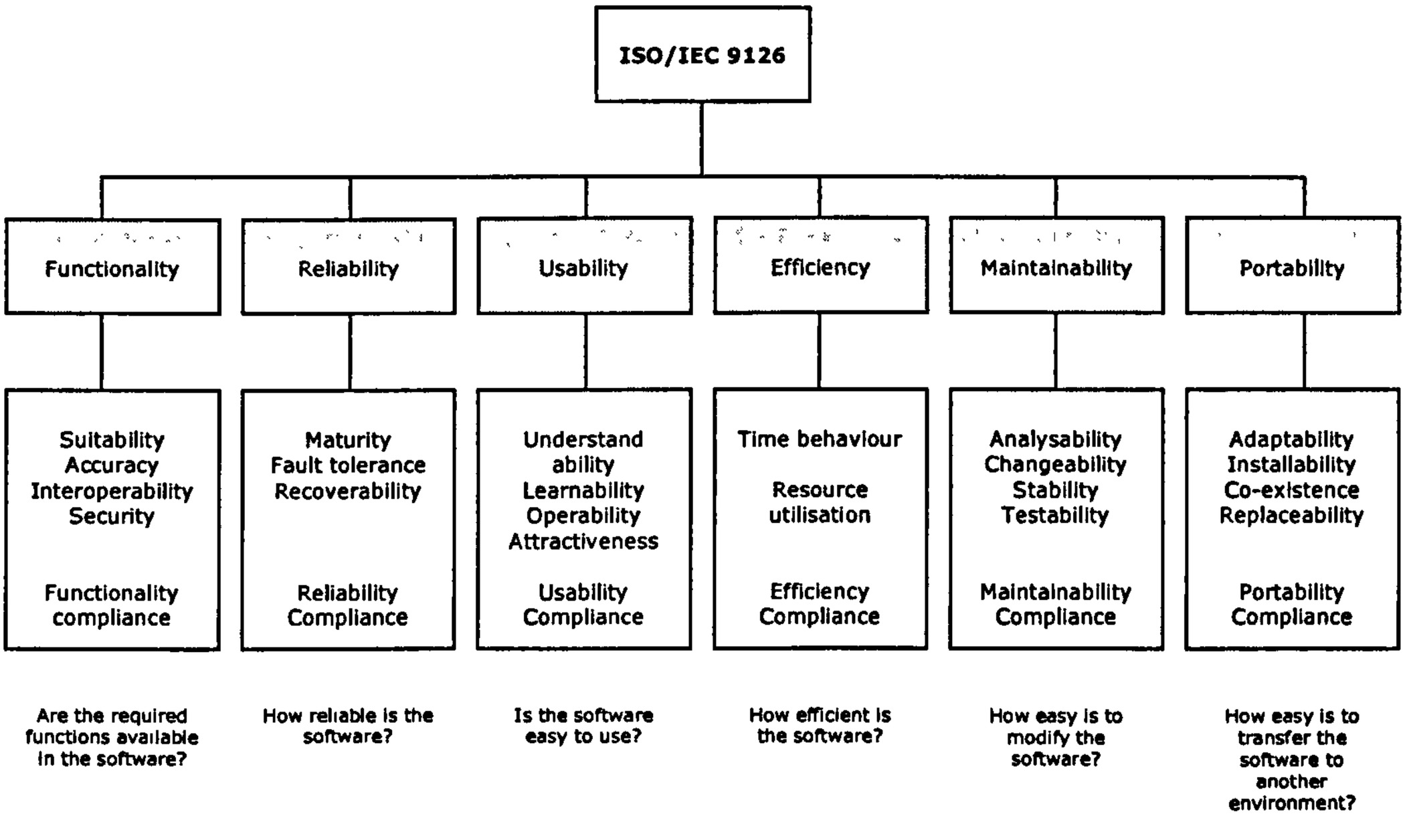


Figure 6.9: ISO/IEC 9126 standards characteristics

One may still argue that if the contract was formulated properly to address project objectives and requirements, it could eliminate all such issues. There has been a tendency in the public sector to not give enough attention or rush through contract formulation in IT projects with much faith and trust in the vendor capabilities in delivering project objectives, especially at this early phase of the project.

The UAE ID project and also the GCC projects witnessed many disputes that took place with the vendor during the project implementation and many of them were due to the contract being unclear about the development methodology of the system, as the contract articles were interpreted in different ways. The UAE ID project contract was well written from a legal perspective; however, it lacked the technical details.

It mentioned that the vendor will use their own system development and implementation methodology that was later found to be based on the traditional

linear system development approach that the vendor was never willing to change or compromise. The project scale and complexity did not allow this area to be addressed thoroughly at the time of writing the contract.

Studies shows that contracts are particularly difficult to establish for information systems projects for the myriad of reasons illustrated in Table 6.4 (Bocij et al., 2003):

Table 6.4: Reasons for establishing a comprehensive IS/IT contracts

Item	Description
Requirements definition	Difficulty to specify the requirements in detail at the outset of the project when the contract is signed.
Acceptable performance	Establishment of an acceptable performance at the outset is difficult because this depends on the combination of hardware and software
Responsibilities definition	Many different suppliers are involved and its often not clear where responsibilities for fixing problems may lie.
After project support	After the project is finished, critical errors can potentially occur and a support contract is required to ensure that they are remedied rapidly.
Escrow code	If a supplier's business fails, the system may be un-maintainable with the software programme, which may need to be put into safekeeping with a third party in a source code escrow agreement.

Source: Bocij et al. (2003)

It is also true that once the supplier is selected and the contract is signed it is like a departing aircraft increasingly going past the point of no return. With large IT projects in government context, once the organisation commits itself to a project, then such projects are walked through with the same vendor normally towards the end. This was true in the UAE and also in other visited projects in Asia and Europe.

Large scale IT projects in government organisations are implemented for strategic objectives, and are normally sponsored by influential figures in the political system. Abandoning such projects would definitely have an impact and attracts the attention and questioning of public about such troubled-projects.

Thus, in such projects, the practice has been to allow the project to complete even if it meant injecting in more money to achieve the objectives - as vendors

normally pressurise client organisations for inflated sums of extra money for changes and adaptations (as demonstrated in the UAE project).

Even if such projects failed after all such attempts, governments tend not attract attention to such projects and initiate other projects to achieve the same objectives. This also takes us to the point made earlier about the validity of statistics of IT projects failure in government organisations in light of the available information about such projects to the public domain.

6.2.5 Technology

In review of national ID projects in many countries around the world (especially the 18+ visited as part of this research), the primary utilised technologies evolve around those highlighted in this study; namely biometrics, smart cards, and public key infrastructure (PKI) - submission one and three provide detailed overview of these technologies. Governments need to give special attention to gain understanding of privacy, interoperability, standards and accuracy of such technologies.

It was noted though that many countries use biometrics and smart cards in their schemes, but give little attention to the third component; PKI. It was widely argued during the course of this research, that national ID projects are viewed to set the infrastructure for many of the future developments and major IT initiatives.

The three technologies - referred to in this research as the trio technologies[13] – and apart from improving traditional approaches to identification and authentication, have the potential to advance e-government and e-commerce as they address the need for *secure digital identity verification*. These technologies should also have a positive impact on the reduction of identity theft and fraud activities; a crime that is growing with horrific impact on governments, businesses, and individuals, with billions of dollars of losses as a result in US (This topic was discussed in a great level of detail in submission one, two and three).

[13] A paper was published on this topic titled 'Digital Identities and the Promise of the Technology Trio: PKI, Smart Cards, and Biometrics,' Journal of Computer Science, vol.3, no. 5, pp.361-367.

6.2.5.1 Choice of Biometrics

The field of biometrics is becoming like a mushroom farm. There are many different biometrics available in the market, ranging from iris scan and fingerprints to body odour and face, but at varying degrees of accuracy and maturity. Table 6.5 shows some of the currently available biometrics in the market and the number of vendors and resellers for each type.

Table 6.5: Biometric types

Biometric Type	Vendors /Resellers	Biometric Type	Vendors /Resellers
Anthropometry	6	Hand Geometry	1
Body Odor	1	Hand Print (Palm)	2
Brain Activity/EGG	0	Hand Vein	2
Cranial Resonance	0	Heart Beat/EGG	0
DNA (de-oxy-ribo-nucleic acid)	3	Iris	6
Ear Shape	0	Key Stroke Dynamics	2
Facial 2D – visible	26	Lip Shape/Movement	1
Facial 2D - thermography	1	Odontology	0
Facial 3D	7	Retinal	1
Fingerprint (Scanners)	23	Signature Dynamics	12
Fingerprint (Algorithms)	23	Vascular Pattern (Hand)	9
Finger Geometry	1	Voice - Speaker Recognition	20
Gait, motion, action	0		

The problem area in biometric methods is that they do not offer 100% certainty of authentication of individuals. The deployment of such systems depends on many factors such as the technical and social factors, user interface, degree of the 'uniqueness' of biometric measure, etc. (Mansfield, 2001).

It is strongly advised that governments carefully consider the choice of biometrics. They need to carefully assess the practicality and reliability aspects. Fingerprints, facial and iris recognition are ideal choices to address this requirement – submissions one to three address this subject in detail.

The three biometrics together provide the best blend for identification and verification requirements. During the course of the UAE project implementation, it was found that all biometrics have limitations inhibiting the enrolment of certain segments of population e.g.,

(1) poor quality of fingerprints of labour workers and old people;
(2) iris does not work with blind people;
(3) reliability of facial biometrics – accuracy limited to less than 40% and returns large list of hits.

The quality of biometrics as indicated earlier largely depends on the algorithm and the type of equipments provided by the supplier. Besides, the environment in which these biometrics are located and the level of user training are vital elements when deploying such systems. For instance, lighting can impact the capturing of iris and cleanness of the fingerprint scanning device can result in lower quality prints, etc.

The implementation of the scheme in the UAE, the review of the other schemes in other countries, and the studies conducted in this regard (see for example, Al-Raisi & Al-Khouri, 2005; Mansfield & Rejman-Greene, 2003; McCeary, 2004) shows that fingerprints and iris recognition are found to provide the best identification and verification performance requirements. Facial recognition is an essential biometric to maintain for physical verification purposes at least.

6.2.5.2 Choice of Smart Cards and PKI Infrastructure

Submission four provided an evaluation of the UAE card project technologies and a comparison of projects elsewhere. There have been significant developments in the field of smart card memory size. 64K or higher cards are more common in the market.

The current encryption technology used in the UAE system and other systems is seen to be up to date and very strong – smart card data is digitally signed with an RSA (1024 key length) a symmetric algorithm. However, it would be an added value if such smart card chips are tested by external institute such as the Common Criteria ELA4+ or FIPS-140 evaluation. This was highlighted in submission four.

Governments need to carefully balance the security features against their costs. If features are implemented which guarantee a very high level of security, it does not make much sense to add additional features without significantly increasing the overall security level of the card. The benefit against the increased cost is low. In terms of analogue features (i.e., conventional physical security features), it is known that if the security increases above a certain level, the cost will

increase dramatically compared to digital security, like chips and cryptographic controls (Ferguson & Schneier, 2003).

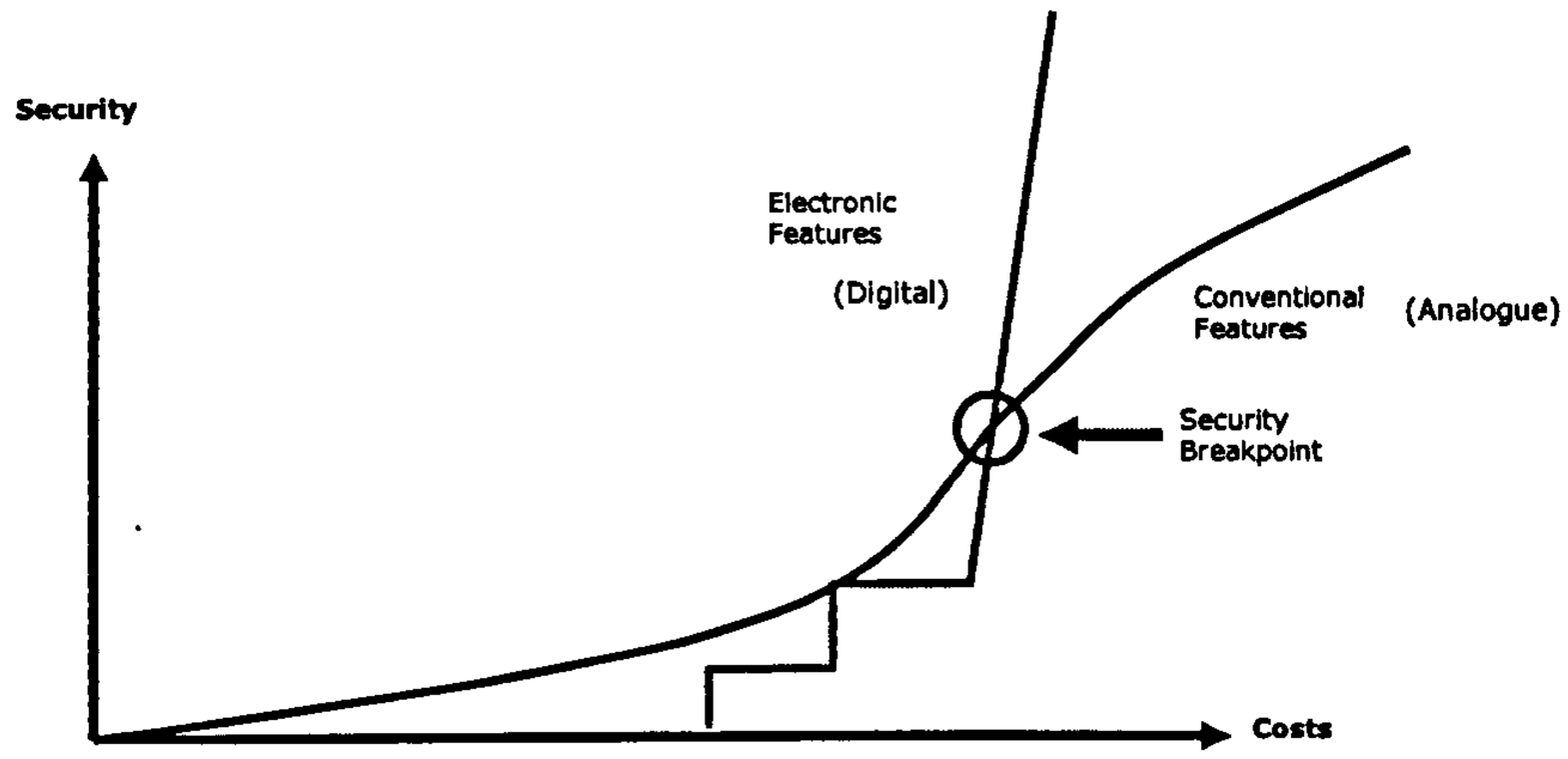


Figure 6.10: Security features vs. Costs

As illustrated in Figure 6.10, up to a certain point, which is the security breakpoint between analogue and digital, analogue becomes more cost effective to implement. The necessary digital chip has always a higher basic start cost than the common analogue security features.

If a chip is implemented, the security increases quickly with applications like PIN codes, encryption and digital signatures. The increase of the security goes in digital steps. If the highest level of chip security is reached, the security is increasing linear to the applications on the chip, like digital signatures and biometrics.

If a chip has such high security features implemented, an increase in the analogue document features will only have a minor implication on the total security structure of the document, but with a high cost impact (Gips, 2006; Hendry, 2001; Zimmerman, 1992). The cost for security will therefore be in the end lower with an electronic chip, than with analogue features.

6.2.6 Project Streams

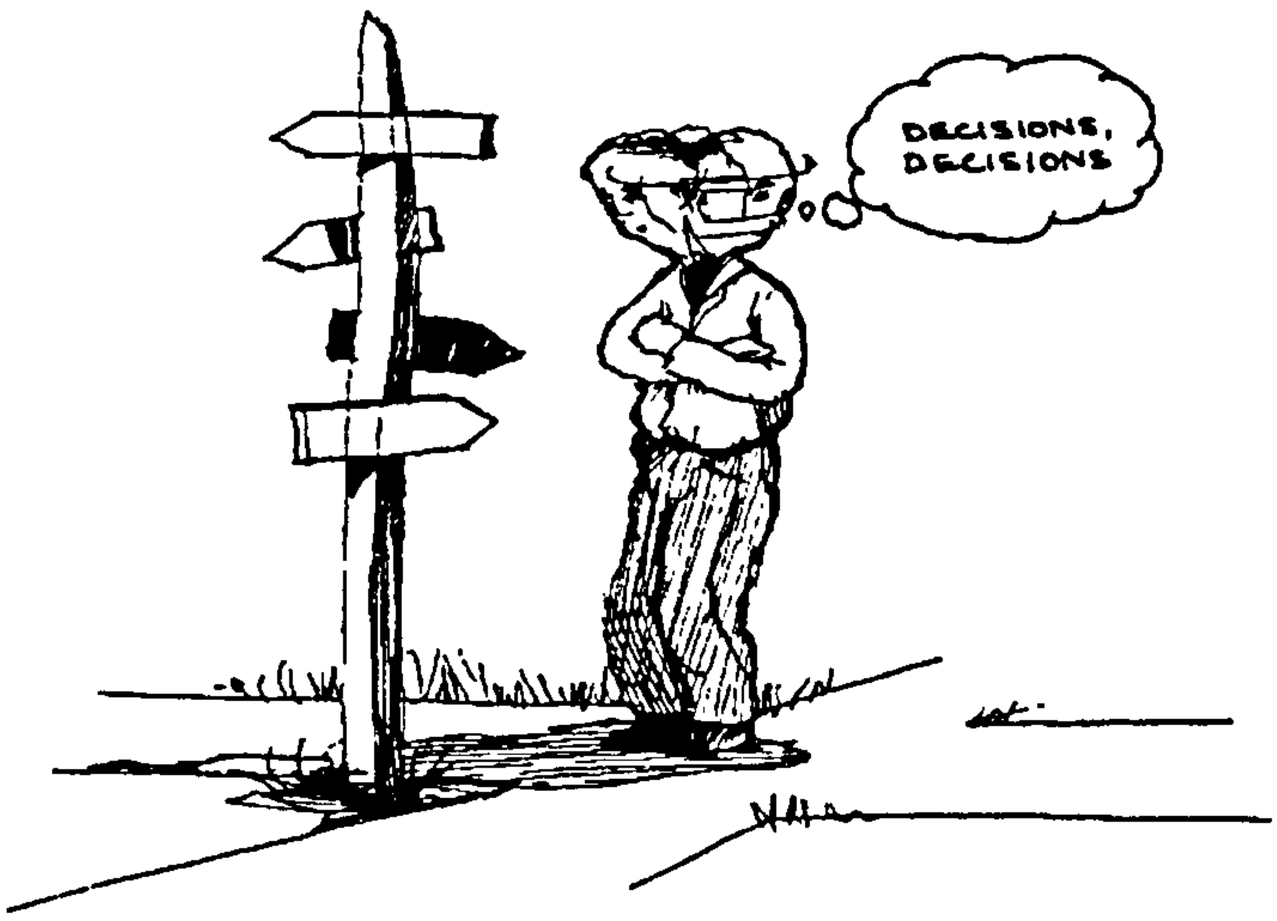


Figure 6.11: Project Streams – a choice of direction!

The activities listed in Table 6.6 were the main tasks that required attention throughout the second stage of the national ID project life cycle. They were not as easy to identify at the early stages of the project, and if were known in advance the project management journey would have definitely been easier from an activity planning and organisation perspective.

The whole journey was somewhat dizzy and foggy at the outset. However, as the project progressed, these were the items that shaped up the whole project. Details of each of the identified element in provided in submission 2. These elements are considered to be one of the most significant contributions of this study.

Table 6.6: National ID Project Streams

- Availability of Data Centre
- Preparation of the first pilot registration centre and furniture
- Preparation and operation of registration centres
- Approval of the ID Card Design
- Finalisation and testing of the external Interfaces i.e., immigration interface and testing the integration with the pilot system
- Recruitment - Appointment of:
  - management staff
  - Administration staff
  - IT and security staff
  - ID card production team
  - registration centres staff
- Legislations:
  - Legal entity / Organisation
  - Law/Authority to issue the ID Card (and obtaining of fingerprints)
  - Obligations to apply and obtain the Card
  - Control of identity (Use of ID card PKI) – i.e., e-authentication laws
- Organisational:
  - Operation Policies & procedures
  - Internal IT Systems (including the security policy)
- Registration business process and application form
- Network (WAN) specifications approval and connectivity to registration centres
- Availability of the Disaster Recovery Site (DRC)
- User Training
- Technical Implementation
- Enrolment plan and strategy
- Media / Marketing campaign

This chapter highlighted some important considerations that were learned primarily from the UAE project and were validated for applicability through discussions with government officials in 5 GCC countries and others visited as well as with the interviewed experts in Asia, Europe, Africa and US. These factors are argued to have serious implications for management and are crucial elements to the overall implementation of the PROMOTE methodology (the first part of this chapter), and ID card projects (second part). The next chapter provides a summary of the innovation claimed by this research study.

Chapter

7 Innovation and Success Validation

Summary: *This chapter attempts to demonstrate the innovation that this study brings to the current body of knowledge. It summarises the process followed in creating and implementing the PROMOTE methodology, and the results obtained. It also describes the measurements made to evaluate and validate the success of the methodology. The chapter concludes with some of the perceived limitations of the methodology as well as the resulting implications for management.*

There are more than 25 ID card projects underway world wide and an even greater number will be initiated by other countries in the coming years. The number of large government IT projects underway is much greater. The worry is, based on previous data on the success rate of large government IT projects; very few if any will come in on time and in budget and within scope (Hencke, 2005; Kent & Millett, 2002; McCue, 2004; Miller & Moore, 1995).

For ID projects considerations for how organisations would identify the major project components, evaluate the system, and accept the system, were not evident in the literature. The available information about such projects was found to be based on theoretical assumptions or hypothesis drawn from similar but different exercises in large public IT systems implementation. Thus any learning and dissemination on how the chances of success for ID projects can be improved will be of great value.[14]

[14] Ten papers were published in academic journals, two of which were quoted in international magazines such as MIT Sloan and ID World. It is also expected that at least five more papers be published in the next year using the content of the EngD submissions.

Figure 7.1 depicts an overview of how this chapter is organised and how it addresses the issue of innovation.

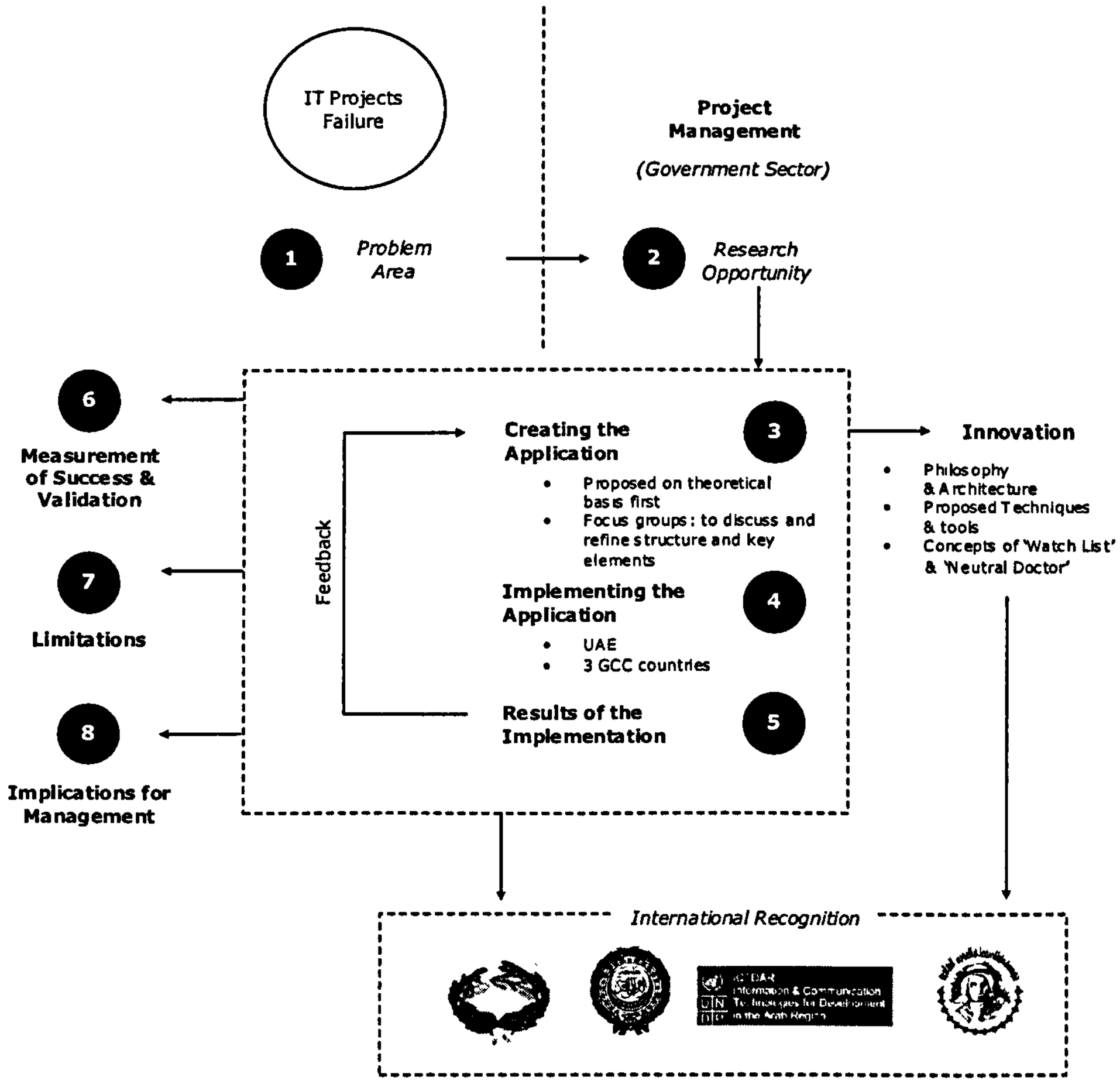


Figure 7.1: Research and Innovation Process Overview

A review of the literature revealed that most of the reported reasons for projects failure were primarily attributed to poor project management practices. Studies show that despite the availability of hundreds of methodologies for managing IT projects, no single methodology has proved totally successful to date (Charvat, 2003; Wideman, 2002).

The author had many discussions regarding government IT projects with government officials during visits to their countries. These highlighted that there is a gap in the current knowledge about the practicality of existing methodologies

because of the limited practical information available in the published literature about their performance in ID Card Projects. These officials also stated that IT project management in the government sector needed significant enhancement (See Appendix-D for details of the officials and experts consulted in this study). All these factors support the need for this research.

A methodology, for use by the customer to drive and manage large government IT projects has been derived and tested. It is believed to provide a better focus on the real project success factors rather than the current emphasis on functionality and technology.

It is important to highlight two key differences in the work undertaken:

1. The vast majority of IT project case studies reported and analysed have been either through the systems companies or consultants directly involved or neutral observers, often academics. This study is one of very few that focuses on the client perspective, representing purely the customer's interests and not the vendor's or consultants perspective.

2. Because the project was of strategic national interest, it was pushed on and developed still based on the original objectives when many more commercial projects would have been modified or adapted. This allowed the project to proceed past the normal barriers and to see effects and consequences which normally may become hidden, by changes in scope and objectives.

The study brings the following key innovations to the current body of knowledge:

- <u>Methodology Philosophy and Architecture</u>:

  Taking the interpretivisim stand, PROMOTE makes its philosophical objectives very explicit, as the focus of the methodology is on improving the overall project management life cycle activities of IT projects. It was mainly developed to guide and support the implementation of large government IT projects. The overwhelming objective is to provide improved understanding of stakeholder concerns and to see the problem situation and requirements from their perspectives.

PROMOTE is designed to be a Hybrid methodology that combines essential elements from the project methodologies and systems development methodologies to combine their strengths and minimise their weaknesses.

From an architecture perspective, and unlike other methodologies, PROMOTE divides projects into two separate phases; stage one puts emphasis on concept development, business requirements definition and planning, and the second stage deals with the management of the project implementation. It pays careful attention to details at the beginning such as the resource needs, required skills, quality of people to be involved, and also a realistic estimation of the effort to develop and implement the project deliverables.

(see also Chapter 4, *Sections 4.2.1 and 4.2.8*)

- Some Techniques and tools:

The following techniques and tools (including templates and matrices) have been adapted by the author within this research study to facilitate the management and implementation of project activities. They are:

- Project communications and reporting techniques
- Tender evaluation process
- Quality management approach
- Risk Management
- Change control process
- Deliverables review model/matrix
- Smart card testing techniques
- Smart ID card assessment framework (card and chip security, algorithm, key length, etc)

They were designed to allow project management staff to more effectively manage and control the quality of deliverables, scope deviations, project communications, etc. The last two approaches were developed specifically for the assessment and evaluation of the smart card technology in the national ID card project.

(see also Chapter 4, *Section 4.2.9*)

- The Watch List:

The Watch list is a tool used by the program manager to provide a common information infrastructure and facilitate improved communications among project management teams and help key stakeholders to monitor project progress, and address critical project subjects. The Watch List concept in the existing project management practices is limited to the identification and management of a project risks. Considered as an integral part of the methodology, the Watch list component in PROMOTE differs in its application and content. In addition to the risks, the Watch list also includes the critical success factors repository, activities on the critical path of the project plan, management issues that may transcend individual projects, etc.

The introduction of the Watch List in the methodology and its application improved and kept the project teams focussed on the project vision and goals, defined scope, business context, and project objectives. This element was practiced in the form of regular meetings with project staff and acted as an open bi-monthly forum for people to put their business and technical concerns on the table.

(see also Chapter 4, *Section 4.2.8.2*)

- The Project 'Neutral Mentor':

Due to the enormous stress and pressure that project managers normally go through, they loose motivation and struggle to gather momentum to conduct their work with the same efficiency and effectiveness they used to have at early stages in the project. The presence of a neutral mentor is believed to make a significant contribution to the well being of the project in the same way that a personal coach is essential to high level performance in most sports today. The neutral element is important in trying to control and "neutralise" the "them and us" mentality that often occurs between project stakeholders. It is recommended that project managers have independent neutral mentors formally appointed for them; preferably by the project owner. The mentor's primary role evolves around understanding the psychological and emotional obstacles that the project manager may face during their involvement in the project and tries to resolve them. Indeed, the consequences of high personnel turnover

can seriously compromise a project and generate a profound negative impact, especially in large public projects.

(see also Chapter 6, *Section 6.1.5*)

The following sections will discuss the process adopted for creating and implementing the methodology, as well as an overview of the results obtained from its implementation.

7.1 Creating the Application

The PROMOTE methodology was developed to support government organisations and provide them with a structured method for effective project lifecycle management, with various control mechanisms to help ensure successful implementation in line with stakeholders' expectations.

The basis of the initial concepts in this study came from recognition of the current literature on existing methodologies and the published learning from other successful, failed or out of control projects. The methodology was conceived and proposed on a theoretical basis first. Focus groups were used to discuss and refine the structure and the key elements.

It is also important to emphasise that the methodology and recommendations in this study were based on the feedback of government officials who have either implemented or are in the process of implementing similar initiatives. These were acquired during visits to countries in four continents (See Appendix-D for details of the visited countries). It also incorporates suggestions by recognised experts and consulting companies working in the field of project management and complex technology systems implementation (See Appendix-D for details of the consulted experts and companies).

As part of the e-Government survey and the interview process discussed in submission three, feedback was obtained from more than 64 participants representing 26 government organisations on the methodology and their areas of concerns in large government IT projects. The feedback was used to check how the new methodology addressed such concerns, and introduced improvements where applicable.

7.2 Implementing the Methodology

The author held a position on the executive steering committee on the UAE national ID project, and was actively involved in all phases from making the case to deployment and assessment. There was visible support from the executive steering committee for the research and the further development and refinement of the PROMOTE methodology.

The initial results from the first trial of the methodology, supported the author in gaining acceptance from three other GCC countries to adopt it in their own projects. This generated another valuable source of experiential feedback to refine the methodology.

It was important for the introduction and implementation of the new methodology to be gradual; step by step. Indeed, a massive change to the way people work is not as likely to succeed as incremental change. Getting people to comprehend and follow the methodology will can work, with proper support as its adoption by other Middles East ID projects has shown.

It was important that project teams be enrolled in high level project management training. It was also important that the methodology is presented to them in a format that they can find relevant and of use in what they are doing and is seen to increase the chances of success if adopted. As such, training programs that address immediate needs, needed to be designed to accommodate the desire for context and relevance.

The ID card project management office acted as a full time methodology coordination body responsible for training, working with teams, and building their feedback into the methodology. The author was a senior project member when the project was kicked off, and a member of the executive steering committee during the course of the project. He was later appointed as the chairman of the technical committee and deputy director general for central operations when the new organisation; Emirates Identity Authority, was established in 2004. The project management office was among several other units under his management responsibilities.

7.3 Results of the implementation

The three dimensions of people, technology, and process must be evaluated and integrated together as a whole for an IT endeavour to succeed (discussed earlier in Chapters 3 and 4). To operate effectively, the methodology needed to be able to be customised to the unique project requirements, where the project staffs, procedures and technology were all carefully aligned.

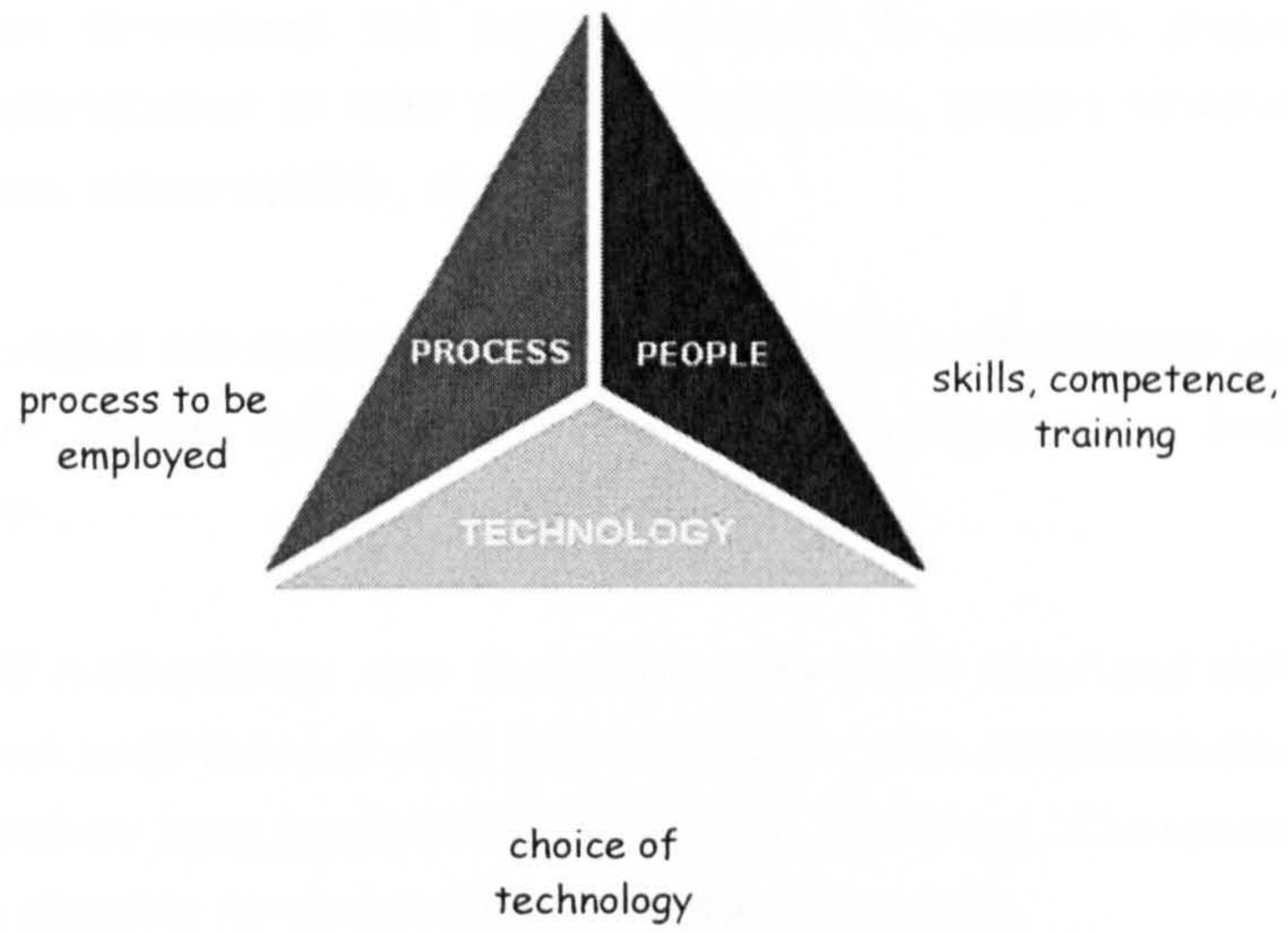


Figure 7.2: The project dimensions

It is crucial that the characteristics of the methodology be consistent and inline with the key drivers of the project and its value proposition. Customising and adjusting the methodology with the business drivers and project realities has the potential to maximise its acceptance and reap benefits (Devaux, 1999; Weill & Ross, 2004).

A methodology is only a discipline which prescribes the way in which projects are to be managed, and provides tools and resources to assist (Berkun, 2005; Kerzner, 2004). The success of this and any methodology can only be ensured by utilising quality people who have the skills in the project management field.

Achieving the right blend of people, process and technology is extremely difficult, as there are so many aspects to manage in large projects, but maintaining a high level of quality performance over an extended time period is even more

challenging (Devaux, 1999). Projects normally prompt people to shift the focus of their work from being a tower of knowledge in their specialised areas to a state where they share their expertise with everybody on the team. Therefore, it was found important to identify and plan the motivation for each group and key individuals.

It was also important to strive to identify champions and transform people into enthusiastic supporters and participants who would drive the project to success. To assist in this regard, the methodology placed great emphasis on communication throughout the project lifecycle to support project progress through the clarification of roles and responsibilities, project structure, decision making process, accountability, etc.

Overall, the project life cycle design of the PROMOTE methodology represented a simple straight forward progression. It maintains a natural flow and division of project phases.

The PROMOTE methodology was designed to lay down clear and defined stages that the project goes through until its completion. The documentation processes in the methodology paid special emphasis to the capturing of business needs and requirements allowing for measurable progress and results.

Among the most positive stated contributions by the project management teams as a result of adopting the methodology were the following:

- Divided the project into manageable stages for more accurate planning
- Improved responsibility, authority and accountability reducing confusion through responsibility assignment matrix
- Improved co-ordination of resources and activities
- Agreed and articulated project goals and objectives
- Staged and controlled phases with sign-offs
- Strong management control through clear change control and conflict management procedures
- Promoted the involvement of management and stakeholders at different stages of the project
- Regular reviews of progress and improved project control – evaluate and measure performance based on the defined scope, schedule, budget, quality of deliverables.

A more focused discussion of the results obtained from its implementation was provided in Chapter 6. The next section provides a brief discussion on validating and evaluating the success of the PROMOTE methodology.

7.4 Measurement of Success and Validation

PROMTOE, despite its infancy, has had some of level of validation. The application of the methodology in 1+3 countries and the feedback from the project management teams provided supporting evidence to its use, applicability, and relevance.

7.4.1 Acceptance

How a methodology was applied in a particular organisation, repeated in other projects and accepted by clients, would be an indicator of success for an information systems methodology according to Avison and Fitzgerald (2001). In this respect, PROMOTE has been successful as it was accepted in the UAE and the model has been accepted and repeated in three more similar government projects.

The methodology was also accepted by the:

- Federal Council of the UAE Government to trial the new methodology in other government sector projects with the author selected to be included in the project management team and as an advisor to the steering committee; and,
- Many government officials who attended presentations about the methodology by the author at International conferences have requested the author to provide training courses on new methodology (e.g., Sri Lanka and Ghana).

However, there is no one best way to assess whether one IS methodology is better than another, without due regard for the context which is different each time (Checkland, 1999). Although PROMOTE had been designed as a methodology with a set of phases and activities, the activities may be amended to the unique situation at the time. The level of control and flexibility was

determined by the project manager and approved by the steering committee and not limited by the methodology itself.

The contributions highlighted in Section 7.3 above provided an indication of the usefulness of the methodology. To prove its real usefulness and contribution as a standard to managing national ID projects and large government IT projects in broader sense, it would require a significant period of time to gather objective quantitative data from different experiments.

Authors such as Clegg et al (1997) as well as Pyka and Küppers (2002) argue that the real success of innovative systems and methodologies depends on complex set of interacting organisational and social forces that are difficult to change thus making the technological and organisational outcomes difficult to predict. Therefore, the case study described in this research provides evidence of its usefulness through its acceptance for a real application and its subsequent performance.

Other elements that can be used to gauge the success of the methodology are discussed in the following sub-sections.

7.4.2 International Recognition

One measure of success of the work undertaken in this study is industry recognition. During the course of this research, the author received the following three awards for his contribution to the field of project management and the implementation of complex IT systems:

- **Outstanding Achievement Award – 2006.** Presented at the fifth ID WORLD International Congress in Milan, Italy. This annual award – part of what are considered as the Oscars of the auto ID industry – was presented to the author in recognition of his contribution as a thought leader, innovator and pioneering adopter who distinguished himself by his achievements and produced the most concrete results in the field of auto ID.

- **Who's Who of Government Technology Middle East Award – 2006.** Presented by UNDP (United Nations Development Programme) and the League of Arab States, in recognition of the author's

contributions and achievements in the field of strategic government IT projects management.

- **Science and Research Innovation Award – 2007.** Presented by one of the most prestigious institutes (Dubai Cultural Council) in the Arab Countries located in Dubai, operated and regulated by the UAE Government. The award was presented to the author in recognition of the new project management methodology he developed and implemented.

See Appendix-E for more details on these awards.

7.4.3 Uncertainty

Davis (1982) suggests measuring the success of a methodology based on how well it would minimise uncertainty. PROMOTE reduced uncertainty through the consistent replication of risk management processes. This was based on careful planning and deep understanding of the current and future business environment, effective resource management, and mitigation of perceived risks (see examples in Submission 1 and 2).

The existing literature provides some prescriptive advice on appropriate strategies to address risks in IT projects, most of the recommended strategies are high level (Barki, Rivard, & Talbot, 2001; Boehm, 1991; Charette, 1996b; Fairley, 1994; Heemstra & Kusters, 1996), rather than at the detailed risk-by-risk level which is prescribed in the PROMOTE methodology.

Overall, the strategies recommended in the PROMOTE methodology revolve round first identifying the specific risks, and then, in the response planning stage, formulating and implementing specific actions to address each risk, on a risk-by-risk basis (see submission 2). The planned actions may range from eliminating, mitigating, or accepting risks depending on their priority. Contingent actions are planned to address the problems that may arise despite any eliminating or mitigating actions that may have been taken.

The PROMOTE methodology also recommends rapid prototyping development and delivery of the system to reduce risk and uncertainty. This is based on the knowledge that some early methodologies only delivered software in the final

phase of development; any errors in earlier phases meant costly rework and often jeopardised the whole project.

7.4.4 Relevance

Judging the success of the methodology in terms of its relevance is difficult. This would depend on the circumstances according to the contingency principle (Davis, 1982). Even if the same set of variables were studied each time, the outcome from applying a methodology would still be different, as one cannot isolate the influence of the developer, the client, or the situation. The people component has made the situation much more complex.

Secondly, the nature of methodologies is that they tend to be unstable, continually moving and refining themselves. One school of thought has been that comparing one methodology with another when each is on its own path of improvement without a reference would be nearly impossible (Avison and Fitzgerald, 2001).

The PROMOTE methodology was mainly developed for use in the Government sector. PROMOTE is relevant to large and complex IT projects, particularly National ID card projects. The methodology structure, project activities and deliverables were designed and scaled according to these factors (explained in Chapter 5).

7.4.5 Other Systematic Perspectives

There are a number of other ways to assess a methodology's success other than through a systematic perspective. An evaluation of the methodology is bound to be subjective and can be criticised on various ground based on the philosophical position and assumptions taken. Nevertheless, from the review of the literature, we could summarise the 'appropriateness' assessment by considering the following factors in evaluating PROMOTE after it had been applied (Avison and Fitzgerald, 2001, p.422):

1. **3E's:** whether efficacy, efficiency and effectiveness of project management practices have been improved as a result (Wilson, 2000)?

2. **Acceptability and Functionality**: whether it fits the organisation culture and is understood by the project team (Mumford, 1981)?
3. **Clear Deliverables**: whether the deliverables were clearly specified at each stage of the process?
4. **Cohesiveness and Integration**: whether there was an overall integration of project management processes with the project activities?
5. **Documentation**: whether sufficient amount of information was available to support project managers and project management teams?
6. **Implementability**: whether the methodology and the system were implemented within context?
7. **Reliability**: whether the project outputs and deliverables were consistent and correct?
8. **Simplicity**: whether the methodology was clear, simple to understand and the degree to which it minimises project complexity?
9. **End Product:** one measure of successful methodologies is the end product of a given project and whether it is accepted by the organisation (Wood-Harper & Fitzgerald, 1982). An evaluation study was carried out of the UAE project as part of a process in the closure phase of the methodology. The evaluation which was based on Lyytinen and Hirschhiem's (1987) framework discussed in Chapter 3 showed the stakeholders viewed the UAE project as a success. The evaluation of the other three GCC projects was not possible as they are still in the execution phase (though near the end).

In summary, one key test of the success of any given methodology is whether a large number of organisations engage it in managing their projects. There are many other possible measures. Given the novelty of the PROMOTE methodology, establishing a stronger argument of its success will need further research and validation. The next section discusses some of perceived limitations of the PROMOTE methodology.

7.5 Perceived Limitations of the PROMOTE Methodology

Each methodology has its own unique features that may distinguish it from other methodologies, but is likely to also have limitations as well. Although its design

supported parallel development efforts, the PROMOTE methodology does not recommend one, and leaves it to the organisation to decide the best fit. Nonetheless, the implementation of the methodology revealed that this area needs to be clarified earlier in the project to ensure a smooth and successful closure.

In the UAE project in particular and in the other initiatives reviewed from around the world, the development methodology adopted tended to be the vendor's own or a customised standard. In these many details are largely hidden and not disclosed to clients. Also in large IT projects, customer organisations tend not to give sufficient attention to such fundamental project areas and trust the vendor to deliver what is required. Often their failure to be "informed customers" leaves them at the mercy of the main vendors. As a project progresses their interests often diverge. The vendor wants to finish the contracted elements, and the client wants to complete the functional project.

The experience of implementing the PROMOTE methodology revealed a limitation in this regard. It did not clarify this area with adequate details, largely because the focus was on the management of the project activities rather than the development effort itself. Comprehension and agreement on how the solution will be developed and deployed by the client company is likely to bring about better appreciation and management of user requirements.

In large IT projects with new and advanced technologies, capturing of requirements tends be a daunting activity, and therefore, such projects are challenged with rapidly changing business and user requirements. Agile development methods are likely to yield more satisfactory results. The UAE project demonstrated this when such approaches were adopted.

Other limitations of the methodology include:

- The scalability of the methodology to manage larger projects was not tested. The project studied was designed to enrol a population of 5 million people;
- Although it promotes the involvement of stakeholders in almost all phases of the methodology, it does not handle the issue of team management comprehensively. The current approach needs further testing to establish if it can work with larger-sized teams;

- The methodology requires highly skilled and motivated individuals.
- The methodology demands increased management attention to project activities;
- Though addressed with procedures to tackle technical challenges, issues related to hardware, operating system, network, database, security risks, interoperability issues were considered outside the scope of the methodology;
- The phases of the second part of the methodology and especially in larger scale initiatives with more sub projects, may increase dedicated resource requirements especially in project management areas.

Having highlighted some of the perceived limitations of the proposed methodology, the next chapter concludes the report, and puts forward some proposals for further research.

Chapter

8

Conclusion

Pointing out the value and importance of project management, Wheatley (2005) states that governments around the world are facing difficulties in enhancing project management capabilities to the scale of the opportunity facing the UK and many other developed economies. He points to the fact that project management as a management discipline underpins much economic activity and that enhanced capabilities in this discipline have the potential to result in greater transformation and development. This research study attempted to add value and contribute to this important area of knowledge.

This engineering doctorate concentrated on an issue of international importance, the management of national ID schemes. It started out as a study of IT and business models and ended up focussing on projects and the effective management of them. It has utilised a client based view in an in-depth case study of one of the leading ID implementations in the world. This phenomenological paradigm' based approach compromises meticulousness in measurement, data integrity, and replicability for accuracy, contextual richness, validity and industry relevance (Bonoma, 1985).

This research highlights and preaches that if implemented properly, ID projects can provide the infrastructure to revolutionise public services and improve how peoples' – both physical and virtual - identities are verified. The infrastructure has the potential to enable and advance G2C e-government initiatives. Governments therefore need to carefully align the smart card, biometric, and PKI technologies to design and build a robust and secure e-government infrastructure.

The nature and size of national ID projects and the complexity of their products requires careful attention if success is to be achieved bearing in mind the previous record from similar public IT based projects.

The outputs from this research are believed to contribute significantly to the overall planning and successful implementation of ID card projects. This belief is founded on the:

1. experience from the UAE project;
2. supporting experience from other GCC ID card projects;
3. feedback from government officials in countries visited (Malaysia, Thailand, Tunisia, Turkey, France, UK, Italy, USA);
4. feedback from experts in the conferences attended worldwide; and
5. the feedback from conferences and official visits undertaken as part of the research.

Though the projects explored in this study were of relatively small country size, the results and learning's should be highly relevant to all such projects. Larger projects in more developed countries would benefit from the better supply of skilled manpower available, a key issue in the projects studied.

The project management methodology; PROMOTE developed and the knowledge dissemination already conducted have enhanced the limited knowledge available in this field. PROMOTE refined and supported the planning and implementation process of the UAE programme significantly. The feedback from three other GCC countries and government officials from other countries has further validated the contribution that the PROMOTE methodology can make in this critical area..

The key innovations introduced in this study are:

1. PROMOTE Philosophy and Architecture:

   Taking the interpretivisim stand, PROMOTE makes its philosophical objectives very explicit, as the focus of the methodology is on improving the overall project management life cycle activities of IT projects. It was mainly developed to guide and support the implementation of large government IT projects. The overwhelming objective is to provide improved understanding of stakeholder concerns and to see the problem situation and requirements from their perspectives.

   PROMOTE is designed to be a Hybrid methodology that combines essential elements from the project methodologies and systems development methodologies to combine their strengths and minimise their weaknesses.

From an architecture perspective, and unlike other methodologies, PROMOTE divides projects into two separate phases; stage one puts emphasis on concept development, business requirements definition and planning, and the second stage deals with the management of the project implementation. It pays careful attention to details at the beginning such as the resource needs, required skills, quality of people to be involved, and also a realistic estimation of the effort to develop and implement the project deliverables.

2. Techniques and Tools:

The following techniques and tools (including templates and matrices) have been adapted within this research study to facilitate the management and implementation of project activities. They are:

- Project communications and reporting techniques
- Tender evaluation process
- Quality management approach
- Risk Management
- Change control process
- Deliverables review model/matrix
- Smart card testing techniques
- Smart ID card assessment framework (card and chip security, algorithm, key length, etc)

They were designed to allow project management staff to more effectively manage and control the quality of deliverables, scope deviations, project communications, etc. The last two approaches were developed specifically for the assessment and evaluation of the smart card technology in the national ID card project.

3. The Watch List:

The Watch list is a tool used by the program manager to provide a common information infrastructure and facilitate improved communications among project management teams and help key stakeholders to monitor project progress, and address critical project subjects. The Watch List concept in the existing project management practices is limited to the identification and management of a project risks. Considered as an integral part of the methodology, the Watch list component in PROMOTE differs in its application and content. In addition

to the risks, the Watch List also includes the critical success factors repository, activities on the critical path of the project plan, management issues that may transcend individual projects, etc.

The introduction of the Watch List in the methodology and its application improved and kept the project teams focussed on the project vision and goals, defined scope, business context, and project objectives. This element was practiced in the form of regular meetings with project staff and acted as an open bi-monthly forum for people to put their business and technical concerns on the table.

4. The Project Neutral Mentor:

Due to the enormous stress and pressure that project managers normally go through, they lose motivation and struggle to gather momentum to conduct their work with the same efficiency and effectiveness they used to have at early stages in the project. The presence of a neutral mentor is believed to make a significant contribution to the well being of the project in the same way that a personal coach is essential to high level performance in most sports today.

The neutral element is important in trying to control and "neutralise" the "them and us" mentality that often occurs between project stakeholders. It is recommended that project managers have independent neutral mentors formally appointed for them; preferably by the project owner. The mentor's primary role revolves around understanding the psychological and emotional obstacles that the project manager may face during his involvement in the project and tries to resolve them. Indeed, the consequences of high personnel turnover can seriously compromise a project and generate a profound negative impact, especially in large public projects.

The next section highlights important management issues that need to be heeded when interpreting and adopting the PROMOTE methodology for managing public IT projects.

8.1 A Message to Management

Projects such as national ID schemes are required to accommodate contingencies arising through uncertainty and unknowns. Figure 8.1 depicts the nature of national ID programmes mapped to a framework proposed by Shenhar & Dvir (2007) for understanding IT projects in terms of complexity, novelty, maturity of technology, and the pace of project operation.

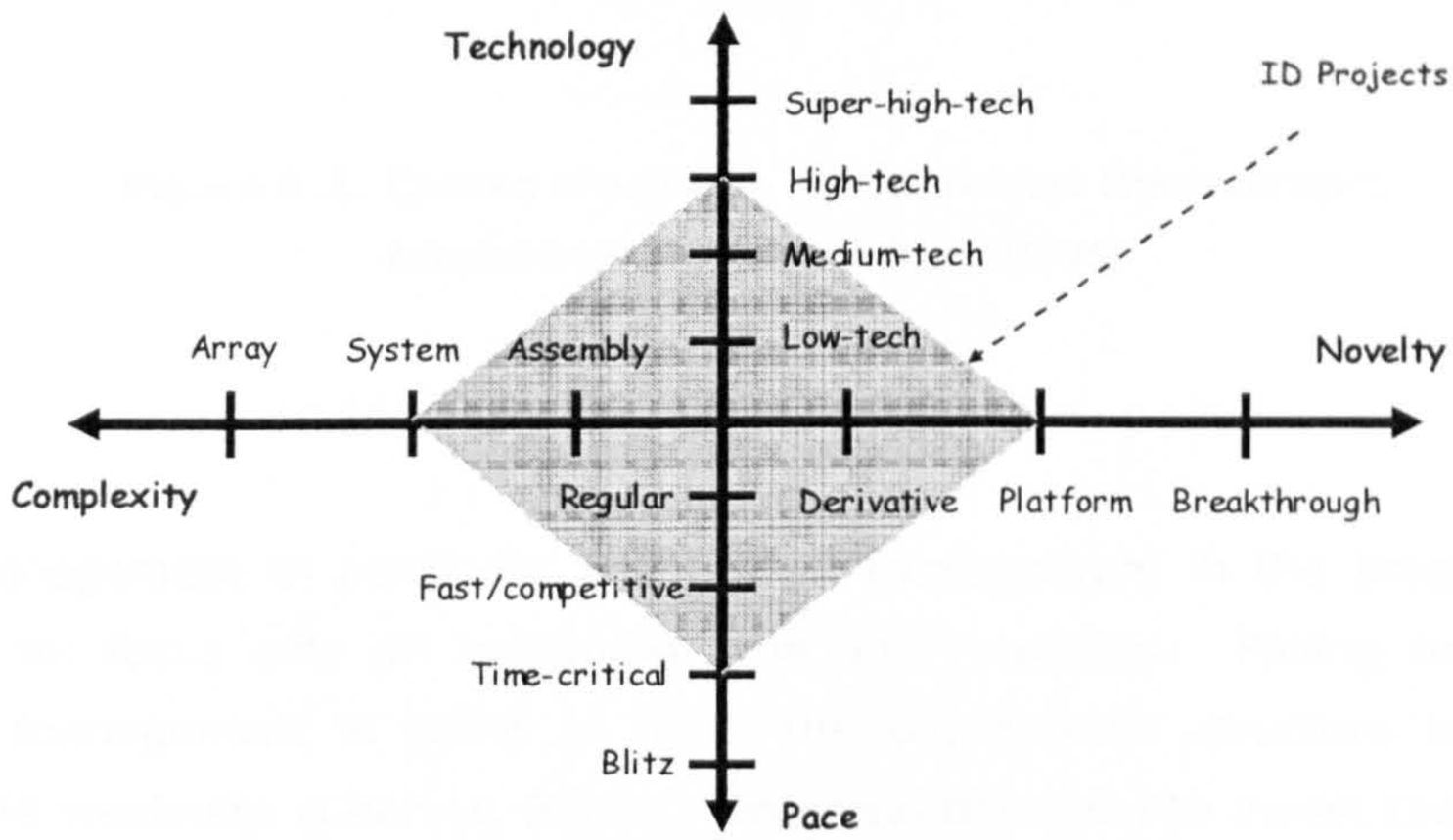


Figure 8.1: Shenhar and Dvir's Framework

Thus, there is an impact from the project characteristics onto the project management practices. These characteristics need to be considered when implementing the PROMOTE methodology to identify the level of formal project organisation structures, the choice of design models and requirements validation process, in light of the timeframe within which the project is expected to be completed. See also Figure 8.2.

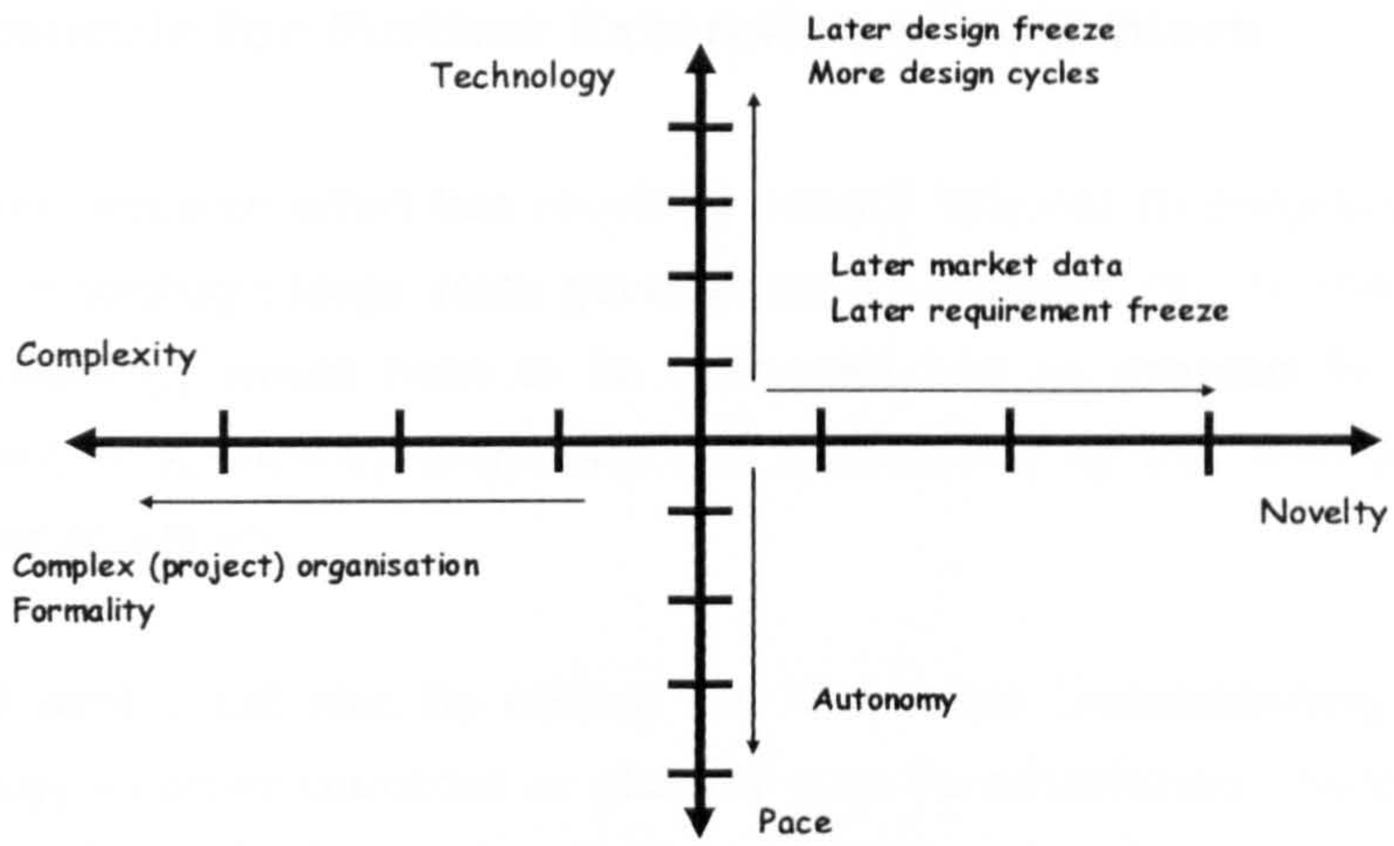


Figure 8.2: Choices of action in light of project characteristics
Adopted from Shenhar and Dvir's (1996)

Risk management in particular and project management in the broader sense should not focus only on managing time and resources. Failing to see how project management is going to fit in the organisation structure is a major corporate weakness (Charvat, 2003). Organisations need to invest the time and energy to understand the culture, identify motivations and ensure change happens where needed.

Charvat (2003) also makes a critical observation that the methodology provides a means for selecting the degree of project management attention appropriate to a particular project. Thus, because of economics and common sense, the project management techniques need to be tailored to the specific risks and opportunities of each project (ibid).

In addition, to meet objectives and stakeholder expectation, project management must be aligned with the organisation's culture and integrated with project objectives and accepted by top management and at all levels of the organisation. Projects aiming for success must have a supportive management team and a culture that is open to constant change.

8.2 Proposals for Further Extension of this Work

The present research effort has revolved around national ID programmes as one of the most strategic large scale government IT endeavours. In the future, this new methodology would need to be calibrated and be adapted for other large scale IT projects, thereby extending the applicability of this methodology to a much wider spectrum.

Additional work must also be carried out if a better understanding of the new methodology in other countries or globally is to be established. Some additional areas in which further research may yield valuable insights for more comprehensive understanding and assist management in determining optimal courses of action are:

1. How can the functions of system development and project management be better integrated from a common project view rather than those of the prime contractor, users and client.

2. How can the goals of the various stakeholders be better aligned, in PROMOTE we are valuing the clients perspective above all others.

3. What methods are there to better balance power among the stakeholders. For example by being able to alter the point of no return, where the costs of alternatives are not much higher than proceeding with the project

4. How can a better and more reliable requirements specification be identified and agreed when the processes, technology and people interactions are largely unexplored in the particular context of the project, as the costs of change and compromise can be very high.

PROMOTE has provided a structured approach for going about project management of large government IT projects, with a focus on national ID programmes. The immediate feedback indicates that it contributes to the overall success of such endeavours.

References

Adelakun, O. & Jennex, M. E. (2002) "Stakeholder process approach to information systems evaluation," Proceedings of 8th America's Conference on Information Systems, Dallas, Texas, USA, 9-11 August, pp. 1186-1194.

Aeron-Thomas, D., Nicholls, J., Forster, S., and Westall, A. (2004) Social Return on Investment: Valuing what Matters. London: New Economics Foundation.

Alavi, M. and Carlson, P. (1992) "A review of MIS research and disciplinary development," Journal of Management Information System, Vol. 8, No. 4, pp. 45-62.

Al-Khouri, A.M. & Bal, J. (2007) "Digital Identities and the Promise of the Technology Trio: PKI, Smart Cards, and Biometrics," Journal of Computer Science, Vol. 2, No. 2.

Al-Khouri, A.M. & Bal, J. (2007) "Electronic Government in the GCC Countries," International Journal Of Social Sciences, Vol. 1, No. 2, pp.83-98.

Al-Raisi, A.N. & Al-Khouri, A.M. (2006) "Iris recognition and the challenge of homeland and border control security in UAE," Telematics and Informatics.

Alter, S. and Ginzberg, M. (1978) "Managing Uncertainty in MIS Implementation", Sloan Management Review, pp. 23-31.

Al-Wohaibi, M.; Masoud, F.A.; & Edwards, H.M. (2002) "Fundamental risk factors in deploying IT/IS Projects in Omani government organizations," Journal of Global Information Management, Vol. 10, No. 4, pp. 1-22.

Andersen, N.; Kensing, F.: Lundin, J.; Mathiassen, L.; Munk-Madsen, A.; Rasbech, M.; and Sorgaard, P. (1990) Professional Systems Development: Experience, Ideas and Action. Hemel Hempstead, UK: Prentice-Hall.

APM Group (1996) "PRINCE2 Case Study, Enterprise Risk Management Project," [Online]. Available from: http://www.prince2.org.uk/nmsruntime/saveasdialog.asp?lID=416&s-ID=147 [Accessed 18 July 2007].

APM Group (2003) "Case study - the National Health Service" [Online]. Available from: http://www.prince2.org.uk/nmsruntime/saveasdialog.asp?lID=473&sID=147 [Accessed April 2006].

Archer, M. (1988) Culture and Agency: The Place of Culture in Social Theory, Cambridge: Cambridge University Press.

Arlotto, P.W. and Oakes, J.L. (2003) "Return on Investment: Maximizing the Value of Healthcare Information Technology," Healthcare Information and Management Systems Society, pp. 1-74.

Arrow, K. (1962) "Economic Welfare and the Allocation of Resources for Information." In NBER (ed.) The Rate and Direction of Inventive Activity. Princeton, N.J.: Princeton University Press.

Atkinson, R. (1999) "Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria," International Journal of Project Management, Vol. 17, No. 6, pp. 337-342.

Avgerou, C. and Walsham, G. (2000) "IT in developing countries." In: Avgerou, C. and Walsham, G. (eds.) Information Technology in Context. Aldershot, UK: Ashgate.

Avison, D.E. & Fitzgerald, G. (1995) Information Systems Development: Methodologies, Techniques and Tools. 2nd ed. Maidenhead: McGraw Hill.

Avison, D.E. & Wood-Harper, A.T. (1990) MultiView - an exploration in information systems development. USA: McGraw Hill.

Avison, D.E. and Fitzgerald, G. (1988) "Information Systems Development: Current Themes and Future Directions," Journal of Information and Software Technology, Vol. 30, No 8, p458-466.

Avison, D.E., Fitzgerald, G. (2003) Information Systems Development: Methodologies, Techniques and Tools, 3rd ed., McGraw-Hill, London.

Avison, D.E., Taylor V. (1997) "Information system development methodologies: a classification according to problem situation," Journal of Information technology, Vol. 12, pp. 73-81.

Axelrod, R. and Cohen, M.D. (1999) Harnessing Complexity - Organisational Implications of a Scientific Frontier. NY: Free Press.

Baark, E. and Heeks, R. (1999) "Donor-funded information technology transfer projects," Information Technology for Development, Vol. 8, No. 4, pp. 185-197.

Ballard, M. (2006) "Aussies to get pseudo-ID Card." The Register [Online]. Available from: http://www.theregister.co.uk/2006/04/26/aussie_pseudo_id/ [Acce-ssed 18 July 2007].

Bannister, F., and Remenyi, D. (2000) "Acts of Faith: Instinct, Value and IT Investment Decisions," Journal of Information Technology, Vol. 15, No.3, pp 231-241.

Barki, S. Rivard and Talbot, J. (1993b) "Toward an assessment of software development risk." Journal of Management Information Systems, Vol. 10, No. 2, pp. 203–225.

Baskerville, R. (1991) "Practitioner autonomy and the bias of methods and tools." In: Nissen, H.-E.; Klein, H.K.; and Hirschheim, R. (eds.) Information Systems Research, Contemporary Approaches & Emergent Trends. Amsterdam: North-Holland, pp. 673–697.

Bates, S. (1998) "Technology Will Target Green-Card Abuse." Nation's Business, Vol. 86, No. 6, p. 8.

Bawden R (1995) "On the systems dimension in FSR," Journal for Farming Systems Research and Extension, Vol. 5, No. 2, pp. 1-18.

BCS - British Computer Society (2004) "The Challenges of Complex IT Projects." The report of a working group from the Royal Academy of Engineering and the British Computer Society, British Computer Society.

BCS - British Computer Society (2007) "Stop the seeds of project failure," Available from: http://www.bcs.org/server.php?show=conWebDoc.14297 [Accessed 19 July 2007].

Beizer, B. (1995) Black-Box Testing: Techniques for Functional Testing of Software and Systems. USA: Wiley.

Belassi, W., Tukel, O.I. (1996) "A new framework for determining critical success/failure factors in projects." International Journal of Project Management, Vol. 14, No. 3, pp. 141-151.

Benaroch, M., and Kauffman, R. (2000) "Justifying Electronic Banking Network Expansion Using Real Options Analysis," MIS Quarterly, Vol. 24, No:2, pp 197-225.

Benbasat, I., Goldstein, D.K. and Mead, M. (1987) "The Case Research Strategy in Studies of Information Systems," MIS Quarterly, Vol. 11, No. 3, pp. 369-386.

Bentley, C. (2001) Prince2: a practical handbook, 2nd Ed. Great Britain: Butterworth – Heinemann.

Bentley, C. (2002) Practical PRINCE2. USA: The Stationery Office Books.

Berg, B.L. (1998) Qualitative Research Methods for the Social Sciences. Boston: Allyn and Bacon.

Berghout, E., and Remenyi, D. (2005) "The Eleven Years of the European Conference on IT Evaluation: Retrospectives and Perspectives for Possible Future Research," Electronic Journal of Information Systems Evaluation, Vol. 8, No.2, pp 81-98.

Berkun, S. (2005) Art of Project Management. Sebastopol, CA: O'Reilly Media.

Berkun, S. (2007) The Myths of Innovation. USA: O'Reilly.

Berry, J. (1994) "Database Marketing: A Potent New Tool for Selling," Business Week, (September 5).

Bhatt, G.D., Grover, V. (2005) "Types of Information Technology Capabilities and Their Role in Competitive Advantage: An Empirical Study," Journal of Management Information Systems, Vol. 22, No. 2, pp. 253-277.

Bielkowicz P., Patel P., Tun T. T. (2002) "Evaluating Information Systems development methods: A new framework." In Proceedings of the 8th International Conference on Object-Oriented Information Systems, Montpellier, France.

Binney, G. and Williams, C. (1997) Learning into the future: Changing the way people change organisations. London: Nicholas Brarly Publishing.

Bjorn-Andersen, N. (1985) "IS research – A Doubtful Science" in Mumford, E., Hirschheim, R.A., Fitzgerald, G. and Wood-Harper, A.T. (eds.) Research Methods in Information Systems, North-Holland, Amsterdam, pp. 273, 277.

Blaikie, N. (1993) Approaches to Social Enquiry. Cambridge: Polity.

Blaxter, L. Hughes, C. & Tight, M. (2001) How to Research. 2nd ed. Buckingham: Open University Press.

Bocij, P., Chaffey, D., Greasley, A., & Hickie, S. (2003) Business Information Systems: Technology, Development and Management for the e-business, 2nd ed. New York: Prentice Hall.

Boehm, B. (1991) "Software risk management: principles and practices," IEEE Software, Vol. 8, No. 1, pp. 32-41.

Bonoma, T. (1985) "Case research in marketing: opportunities, problems, and a process," Journal of Marketing Research, Vol. 12, pp. 199-208

Braa, J. and Hedberg, C. (2000) "Developing district-based health care information systems." In Information Flows, Local Improvisations and Work Practices, Proceedings of the IFIP WG9.4 Conference, Cape Town, South Africa.

Bredillet, C. (2002) "Killing the false gods of project management." PMForum [Online]. Available from: http://www.pmforum.org [Accessed 19 July 2007].

Broder, J.F. (1999) Risk Analysis and the Security Survey, 2nd ed. Boston: Butterworth-Heinemann

Brooks, F. P. Jr. (1987) "No Silver Bullet: Essence and Accidents of Software Engineering," Computer, Vol. 20, No. 4 , pp. 10-9.

Brynjolfsson, E. (1994) "Technology's True Payoff," Information Week, pp. 34-36.

Brynjolfsson, E., and Yang, S. (1996) "Information Technology and Productivity: A Review of the Literature," Advances in Computers, Vol. 43, pp 179-214.

Burnes, B. (2000) Managing Change: A Strategic Approach to Organisational Dynamics, 3rd ed. New York: Prentice Hall.

Burnett, S. (2007) "One view on how to tackle governmetn IT related failures," Computer Weekly.com [Online]. Available from: www.computerweekly.com [Accessed 18 October 2007].

Burrell, G. and Morgan, G. (1979) Sociological Paradigms and Organisational Analysis. Ashgate: Aldershot.

Burris, V. (1987) "The Neo-Marxist Synthesis of Marx and Weber on Class," in Wiley, N. (ed.). The Marx-Weber Debate. Newbury Park, CA: Sage Publications.

Bury J.B. (1932) The idea of progress: An inquiry into its growth and origin. New York: Dover.

Busby, J.S. and Hughes, E.J. (2004) "Projects, pathogens and incubation processes." International Journal of Project Management, Vol. 22, pp. 425-434.

Buxbaum, P. (2004) "Culture Wars: does the IT subculture contribute to project failure?," ComputerWorld, Vol. 38, No. 18, p.35.

Cairns, G., Wright, G., Bradfield, R., Heijden, K., Burt, G. (2004) "Exploring e-government futures through the application of scenario planning," Technological Forecasting and Social Change, Vol. 71, pp. 217-238.

Callaway, E. (1999) Enterprise Resource Planning: Integrating Applications and Business Processes Across the Enterprise. USA: Computer Technology Research Corp.

Camp, L.J. (2003) "Identity in Digital Government - A research report of the digital government civic scenario workshop" [Online]. Cambridge, USA, Kennedy School of Government. Available from: http://www.ljean.com/files/identi-ty.pdf [Accessed 08 March 2007].

Capra, F. (1996) The web of life: A new scientific understanding of living systems. New York: Anchor Books.

Carson, R. (2003) Taming your Gremlin: A Surprisingly Simple Method for Getting Out of Your Own Way. US: Collins.

Chang, She-I. (2006) "An alternative methodology for Delphi-type research in IS key issues studies," Management and Enterprise Development, Vol. 3, Nos.1/2, pp.147-168.

Chapman, A. (2000) "Project Managment," Businessballs [Online]. Available from: http://www.businessballs.com/project.htm [Accessed 3 October 2007].

Charette, R.N. (1995) "Why Software Fails," IEEE Spectrum [Online]. Available from: http://www.spectrum.ieee.org/sep05/1685.

Charette, R.N. (1996) "Large-scale project management is risk management", IEEE Software, Vol. 13, No.4, pp.110.

Charvat, J. (2003) Project Management Methodologies, NJ: John Wiley & Sons.

Chatzoglou, P., and Macaulay, L. (1996) Requirements capture and IS methodologies. Information Systems Journal, Vol. *6, No.* 3, pp. 209–225.

Chawla, S. and John R. (1995) Learning Organizations: Developing Cultures for Tomorrow's Workplace. Portland, Oregon: Productivity Press.

Checkland, P. and Holwell, S. (1998) Information, Systems, and Information Systems: Making sense of the field. Chichester: John Wiley & Sons.

Checkland, P. (1999) Systems Thinking, Systems Practice, Chichester: John Wiley & Sons.

Checkland, P. and Scholes, J. (1990) Soft Systems Methodology in Action. Chichester: Wiley.

Chircu, A.M., and Lee, D.H.-D. (2003) "Understanding IT Investments in the Public Sector: The Case of E- Government," Proceedings of the Ninth Americas Conference on Information Systems (AMCIS), Tampa, Florida, pp. 792-800.

Chua, W.F. (1986) "Radical developments in accounting thought." The Accounting Review, Vol. 61, No. 4, pp. 601-632.

Chung, K.H. (1986) Management: Critical Success Factors. USA: Longman Higher Education.

Clarke, R.A. (1992) "The Resistible Rise of the National Personal Data System," Software Law Journal, Vol. 5, No. 1, pp. 33-36.

Clarke, R.A. (1994) "Human Identification in Information Systems: Management Challenges and Public Policy Issues" [Online]. Australia, The Australian National University. Available from: http://www.anu.edu.au/people/Roger.Clarke/DV/HumanID.html#PPI [Accessed 15 September 2007].

Clegg, C., Carey, N., Dean, G., Hornby, P. & Bolden, R. (1997) "Users' Interaction to Information Technology: some multivariate models and their implications," Journal of Information Technology, Vol. 12, pp 15-32.

Clutterbuck, D. & Megginson, D. (1999) Mentoring Executives & Directors. London: Butterworth- Heinemann.

Cohen, L., & Manion, L. (1989) Research Methods in Education. 3rd ed. London, England: Routledge.

Cohen, L., Manion, L. and Morrison, K. (2001) Research Methods in Education. 5th ed. London; Routledge/Falmer.

Collins, T. (2006) "Government IT: What happened to our £25bn?" IT Management, Politics & Law, ComputerWeekly.com [Online]. Available from: http://www.computerweekly.co-m/Articles/2006/10/30/219476/government-it-what-happened-to-our-25bn.htm [Accessed 13 November 2007].

Conroy, G. and Soltan, H. (1997) "ConSERV, a methodology for managing multi-disciplinary engineering design projects." International Journal of Project Management, Vol. 15, pp. 121–132.

Cooke, D., Gelman, L., Peterson, W.J. (2001) "ERP Trends," The Conference Board. New York [Online]. Available: http://www.conferenceboard.ca [Accessed 12 May 2007].

Cooke-Davies, T. (2002) "The 'Real' Success Factors on Projects." International Journal of Project Management, Vol. 20, pp. 185–190.

Cooke-Davies, T. J. and Arzymanow, A. (2003) "The maturity of project management in different industries: An investigation into variations between project management models." International Journal of Project Management, Vol. 21, pp. 471–478.

Cooper, R.B. and Swanson, E.B. (1979) Management information requirements assessment: An annotated bibliography. Information Systems Working Paper 10-79, Graduate School of Management, UCLA.

Cornford, T. and Smithson, S. (2006) Project Research in Information Systems, 2nd Edition. London: Palgrave.

Correia, E.J. (2004) 'Study Reveals Why Most Projects Fail', Software Development Times (September, 1), Vol. 109, p.19.

Craig, R.T. (1989) "Communication as a practical discipline." In: Dervin, B., Grossberg, B.J. & Wartella, E. (Eds.) Rethinking Communication. Newbury Park, CA: Sage. (pp. 97-122)

Crain, W. (1992) Theories of Development: Concepts and applications, 3rd edition. New Jersey: Prentice Hall International.

Crawford, J.K. (2002) The strategic project office: A guide to improving organisational performance. New York: Marcel Dekker, Inc.

Crawford, L. (2004) Global Body of Project Management and Knowledge. In Morris, P.W.G., Pinto, J.K. (Eds.) The Management of Projects Resource Book. New York: Wiley and Sons.

Crawford, L., Bredillet, C. and Turner, J.R. (2007) Project Governance: Integrating Corporate, Program and Project Governance. London: Routledge.

Cresswell, A.M., Burke, B.G. and Pardo, T.A. (2006) Advancing return on investment analysis for government IT - a public value framework. Center for Technology in Government, University at Albany, SUNY.

Cross, M. (2002) "Why government IT projects go wrong," Computing, [Online]. Available from: http://www.itweek.co.uk/computing/features/2072199/why-government-proje-cts-wrong [Accessed 12 June 2007].

Curtis, G. (1998) Business Information Systems: Analysis, Design, and Practice. 3rd edition, USA: Addison-Wesley.

Danielyan, E. (2004) "The Lures of Biometrics," The Internet Protocol Journal, Vol. 7, No.1 [Online]. Available from: http://www.cisco.com/web/about/ac123/ac147/archived_issues/ipj_71/lures_of_biometrics.html [Accessed 17 November 2007].

Davenport T.H. (1998) "Putting the Enterprise into the Enterprise system." Harvard Business Review, Boston, pp. 121-131.

Davenport, T.H. (2000) Mission Critical: Realizing the Promise of Enterprise Systems. Boston: Harvard Business School Press.

Davidow, W.H. and Malone, M.S. (1993) The Virtual Cooperation. New York: Harper Collins.

Davis, A. (1995) "Digital IDs for workers in the Cards." National Law Journal, (April 10), pp.1-21.

Davis, D. (1985) "New Projects: Beware of False Economies", Harvard Business Review, Vol. 63, No. 2, pp. 95-101.

Davis, G.B. (1982) "Strategies for Information Requirements Determination." IBM Systems Journal, England, Vol. 21, No. 2.

de Grace, P., Stahl, L. (1993) The Olduvai Imperative: CASE and the State of Software Engineering Practice, Englewood Cliffs, NJ: Prentice-Hall.

Dehning, B., and Richardson, V. (2002) "Returns on Investments in Information Technology: A Research Synthesis," Journal of Information Systems, Vol. 16, No. 1, pp 7-30.

Denzin, N.K. and Lincoln, Y.S. (eds.) (1998) Collecting and Interpreting Qualitative Materials. Thousand Oaks: Sage.

Devadoss, P.R., Pan, S.L., & Huang, J.C. (2002) "Structurational analysis of e-government initiatives: a case study of SCO," Decision Support Systems, Vol. 34, pp. 253-269.

Devaux, Stephen A. (1999) Total Project Control. New York: John Wiley & Sons.

Dey, I. (1993) Qualitative Data Analysis : A User Friendly Guide for Social Scientists. London: Routledge.

Drucker, P.F. (1988) "The coming of the new organisation." Harvard Business Reviews, pp. 45-53.

Drucker, P.F. (2006) Innovation and Entrepreneurship. New York: Collins.

DTI - Department of Trade and Industry (2003) "Competing in the Global Economy: The Innovation Challenge." [Online]. London: The Stationery Office. Available from: http://www.dti.gov.uk/innovationreport/innovation-report-full.pdf [Accessed 12 May 2007].

Duncan, W. (1996) A guide to the Project Management Body of Knowledge. PMI Publications, Sylva, NC.

Duris, R. (2002) "Top 10 reasons why WMS projects fail." Frontline Solutions, (April, 2002), Vol. 3, No. 4, p. 62.

Dvir, D., Lipovetsky, S., Shenhar, A. and Tishler, A. (1998) "In search of project classification: a nonuniversal approach to project success factors." Research Policy, Vol. 27, pp. 915 – 935.

Earl, M. J. (1996) Information Management: The Organisational Dimension. New York: Oxford University Press.

Easterby-Smith, M., Thorpe, R., and Lowe, A. (1997) Management research: An introduction. London: SAGE Publications.

EFF - Electronic Frontier Foundation (2002) "Biometrics, Surveillance, National ID Threats to Privacy" [Online]. Available from: http://w2.eff.org/Privacy/20020613_eff_privacy_pr.html [Accessed 18 July 2007].

Elpez, I. and Fink, D. (2006) "Information Systems Success in the Public Sector: Stakeholders' Perspectives and Emerging Alignment Model," Issues in Informing Science and Information Technology, Vol. 3.

Episkopou, D. (1987) The theory and practice of information systems methodologies: a grounded theory of methodology evolution, Ph.D. dissertation, University of East Anglia, UK.

Erlandson, D.A., Harris, E., Skipper, B. & Allen, S. (1993) Doing Naturalistic Inquiry: A guide to methods. Newbury Park, CA: Sage Publications.

ESI - ESI International (2007) "Eight Things Your Business Analysts Need to Know: A Practical Approach to Recognising and Improving Competencies." [Online]. Available from: http://www.esi-intl.com/public/downloads/whitepaper/whitepaper.aspx [Accessed 12 May 2007].

Everitt, N. and Fisher, A. (1995) Modern Epistemology - A New Introduction. London: McGraw Hill.

Fairley, R. (1994) "Risk management for software projects." IEEE Software, Vol. 11, No. 3, pp. 57–67.

Fay, B. (1987) "An Alternative View: Interpretive Social Science," in Gibbons, M.T. (ed.) Interpreting Politics. New York: New York University Press, pp. 82- 100.

Feeny, D.F. and Willocks, L.P. (1998) "Core IS Capabilities for Exploiting Information Technology," Sloan Management Review, Vol. 39, No. 3.

Fenton, N.E. (1994) "Software measurement: a necessary scientific basis," IEEE Trans Software Eng, Vol. 20, No. 3, pp. 199-206.

Ferguson, N. and Schneier, B. (2003) Practical Cryptography. NJ.: John Wiley & Sons.

Fichter, D. (2003) "Why Web projects fail," Online (July/August), Vol. 27, No. 4, pp. 43-45.

Fitzgerald, B. (1996) "An investigation of the use of systems development methodologies in practice." in Coelho, J. et al. (Eds), Proceedings of the 4th ECIS, Lisbon, pp.143-62.

Fitzgerald, E.J., Toi, A. & Cochlin, D.L. (1985) Conjoined twins. Antenatal ultrasound diagnosis and a review of the literature. Br. J. Radiology, Vol. 58, pp. 1053-1056.

Flannes, S.W. and Levin, G. (2001) People Skills for Project Managers. Vienna, VA: Management Concepts Inc.

Flare - Flare Consulting (2005) "Project Value Review: Healthcheck," [Online]. Available from: http://flareconsulting.ca/pvr.htm [Accessed 12 May 2007].

Flowers, S. (1996) Software Failure: Management Failure. West Sussex, UK: John Wiley & Sons.

Flynn, D. (1998) Information Systems Requirements: Determination and Analysis. 2nd Edition. NY: McGraw-Hill.

Fontana, J. (2003) "A national Identity Card for Canada," Canada. House of Commons [Online]. Available from: http://www.parl.gc.ca [Accessed 02 August 2007].

Foster, M. (1972) "An introduction to the theory and practice of action research in work organizations." Human Relations, Vol. 25, pp. 529-556.

Froman, B. (1997) Guide to Preparing the Corporate Quality Manual. USA: CRC.

Froomkin, A.M. (2003) "The uneasy case for national id cards as a means to enhance privacy," University of Miami School of Law [Online]. Available: http://www.law.tm. [Accessed 01 05 2007].

Gable, G. (1994) "Integrating Case Study and Survey Research Methods: An Example in Information Systems." European Journal of Information Systems, Vol. 3, No. 2, pp. 112-126.

Galliers, R.D. (1991) "Choosing appropriate Information Systems research approaches: a revised taxonomy," In: Nissen, H.-E.; Klein, H.K.; and Hirschheim, R. (eds.) Information Systems Research, Contemporary Approaches & Emergent Trends. Amsterdam: North-Holland, pp. 327-345.

GAO (1992) 'Strategic Information Planning: Framework for Designing and Developing System Architectures', General Accounting Office [Online]. Available: http://161.203.16.4/d3-2t10/146630.pdf [Accessed 01 05 2007].

Gardiner, G. (2007) "IT failings shouldn't be a bar to ID cards," ITWeek [Online]. Available from: http://www.itweek.co.uk/itweek/comment/2191130/failings-shouldn-bar-id-cards [Accessed 18 July 2007].

Gartner Group View (1999) "Are all IT projects doomed for failure," Asia Computer Weekly, Singapore (Septemeber), p. 1.

Garton, C. and McCulloch, E. (2005) Fundamentals of Technology Project Management. USA: Mc Press.

Gauld, R. (2007) "Public sector information system project failures: Lessons from a New Zealand hospital organization." Government Information Quarterly, Vol. 24, No. 1, pp. 102-114.

Getronics (2003) "PRINCE2 and PMI/PMBOK®, A Combined Approach," [Online]. Available from: http://www.prince2.org.uk/nmsruntime/saveasdialog.asp?lID=412&sID=147 [Accessed 16 August 2007].

Gibbons, M.T. (1987) "Introduction: the Politics of Interpretation," In Gibbons, M.T. (ed.) Interpreting Politics. New York: New York University Press, pp. 1-31.

Gilb, T. (2005) "Software Project Management: Adding Stakeholder Metrics to Agile Projects," Overload Journal, Vol. 68. [Online]. Available from: http://accu.org/index.php/journals/286 [Accessed 11 June 2007]

Gilbreath, R.D. (1986) Winning at Project Management: what works, what fails and why. New York: John Wiley & Sons.

Ginzberg, M.J., (1980) "An Organizational Contingencies View of Accounting and Information Systems Implementation," Accounting, Organizations and Society, Vol. 5, pp. 369-382.

Gips, M.A. (2006) 'Challenges confront federal smart card,' Security Management [Online]. Available from: http://www.securitymanagement.com [Accessed 01 May 2007].

Gladden, G. (1982) "Stop the Lifecycle I Want to Get Off," Software Engineering Notes, Vol. 7, No. 2, pp. 35-39 (April).

Glense, C. (1999) Becoming Qualitative Researchers: An Introduction. New York: Addison Wesley Longman.

Goldman, J. (2004) "Personal Information and Privacy," Computer Professionals for Social Responsibility [Online]. Available from: http://www.cpsr.org/prevsite/conferences/cfp91/goldman.html [Accessed 12 August 2007].

Grant, R. (1991) "Prospering in dynamically competitive environments: organisational capability as knowledge integration," Organisation Science, Vol. 7, pp. 375-387.

Grindley K. (1995) Managing IT at Board Level. 2nd Edition. London: FT Pitman Publishing.

Griswold, D.T. (2001) "Don't Blame Immigrants for Terrorism," CATO Institute Policy Analysis, Washington, DC. [Online]. Available from: http://www.cato.org [Accessed 01 05 2007].

Grossman, I. (2003) "Why so many IT projects fail, and how to find success," Financial Executive (May), Vol. 19, No. 3, pp. 28-29.

Gubrium, J.F. and Holestein, J.A. (1997) The New Language of Qualitative Method. New York: Oxford University Press.

Gunasekaran, A., Love, P.E., Rahimi, F., & Miele, R. (2001) "A model for investment justification in information technology projects," International Journal of Information Management, Vol. 21, No. 5, p.349.

Haller, R. (1998) Managing Change. London: Dorling Kindersley.

Hammer, M. & Champy, J. (1994) Reengineering the Corporation: A Manifesto for Business Revolution. London: Nicholas Brealey Publishing.

Hardy, C.J.; Thompson, J.B.; and Edwards, H.M. (1995) "The use, limitations and customization of structured systems development methods in the United Kingdom." Information and Software Technology, Vol. 37, No. 9, pp. 467–477.

Harman, W. (1970) An incomplete guide to the future. New York: W.W. Norton.

Harry, M. (1997) Information Systems in Business, 2nd edition. Great Britain: British Library Cataloguing in Publication Data.

Hart, E. & Bond, M. (1995) Action Research for Health & Social Care: A Guide to Practice. Philadelphia: Open University Press.

Hartman, F. and Ashrafi , R. (2004) "Development of the SMARTTM Project Planning framework." International Journal of Project Management, Vol. 22, pp. 499–510.

Hatten, R. Knapp, D. & Salonga, R. (1997) "Action research: Comparison with the concepts of 'the reflective practitioner' and 'quality assurance'." In: Hughes, I. (ed.) Action Research Electronic Reader, University of Sydney [Online]. Available from: www.cchs.usyd.edu.au/arow/reader/rdr.html [Accessed 17 April 2007]

Heeks, R. (2003) "eGovernment for Development," University of Manchester, UK [Online]. Available from: http://www.e-devexchange.org/eGov/faileval.htm. [Accessed 15 May 2007].

Heemstra, F.J. and Kusters, R.J., (1996) "Dealing with risk: a practical approach," Journal of Information Technology, Vol. 11, pp. 333-346.

Heerkens, G.R. (2003) Project Management. New York: McGraw-Hill.

Hencke, D. (2005) "MPs warn of 70 failing Whitehall IT projects," The Guardian, 5 July 2005 [Online]. Available from: www.guardian.co.uk/guardianpolitics/story/0,,15-21324,0-0.html [Accessed 13 November 2007].

Henderson, P. (1998) "Laws for Dynamic Systems," Proceedings of International Conference on Software Reuse (ICSR 98), IEEE Computer Society Press.

Henderson, P. (2006) "Why Large IT Projects Fail," School of Electronics and Computer Science, University of Southampton [Online]. http://www.ecs.soton.ac.uk/~ph/-LargeIT.pdf [Accessed 13 July 2007].

Hendry, M. (2001) Smart Card Security and Applications, 2nd edition. USA: Artech House Publishers.

Henwood, K.L. and Pidgeon, N.F. (1993) "Qualitative Research and Psychological Theorising," in Hammersley, M. (ed.) Social Research. London: Sage.

Herbst, P.G. (1974) Sociotechnical Design. London: Tavistock.

Hetzel, B. (1993) The Complete Guide to Software Testing, 2nd edition. USA: Wiley.

Hirschheim, R. A. (1985) "Information Systems Epistemology: An Historical Perspective." In: Mumford, E.; Hirschheim, R.; Fitzgerald, G. & Wood-Harper, T. (eds.) Research Methods in Information Systems (IFIP 8.2 Proceedings), North-Holland, Amsterdam, pp. 13 – 36

Hirschheim, R. and Klein, H. (1989) "Four paradigms of information systems development," Communications of the ACM, Vol. 32, No. 10, pp. 1199-1216.

Hirschheim, R., & Smithson, S. (1986) "A critical analysis of information systems evaluation." In: Bjørn-Andersen, N. & Davis, G.B. (eds.) Information Systems Assessment: Issues and Challenges; Proceedings of the IFIP WG 8.2 Working Conference on Information Systems Assessment (Noordwijkerhout, The Netherlands, August 27-29, 1986), Amsterdam: North-Holland, 17-37.

Hitchin, D. & Ross, W. (1994) Achieving Strategic Objectives: The Role of Human Resources and Organizational Development. USA: Addison Wesley Longman Publishing Co.

Hofer, C.W. & Schendel, D. (1978) Strategy formulation: Analytical concepts. St.Paul.: West Publishing.

Huber, N. (2003) "Hitting targets? The state of UK IT project management," ComputerWeekly, (November 5).

Huberman, A.M. & Miles, M.B. (1994) "Data management and analysis methods," In Denzin, N.K. and Lincoln, Y.S. (eds.) Handbook of Qualitative Research. California: Sage, pp.428-444.

Humphrey, W.S, (2004) "Why Big Software Projects Fail: The 12 Key Questions," The Journal of Defense Software Engineering, March Issue.

Hunt, S. (2002) "National ID debate: Tech advances, public concern?" Security, Vol. 39, No. 1, p.21.

Hunter, R. (1997) "Once Is Not Enough," CIO, USA [Online]. Available from: http://www.cio.com/archive/030197/gartner.html [Accessed 16 June 2007].

Hussain, A. (2004) Complexity based framework for managing change in disciplined organisations. Doctoral Thesis, University of Hull.

Hutchins W.J. (1982) "The evolution of machine translation systems." In: Practical experience of machine translation, Proceeding ASLIB-81 Conference, London, 5-6 Nov. 1981, Lawson, (ed) North Holland, 21-37.

Intellect (2000) "Getting IT Right for Government," Intellect (Formerly the Computing Services and Software Association) June, London.

IPMA (1999) ICB: IPMA Competence Baseline. Caupin, G., Knopfel, H., Morris, P., Motzel, E. and Pannenbacker, O., (Eds.) Germany: International Project Management Association.

Ireland, L.R. (1991) Quality Management for Projects and Programs. USA: Project Management Institute.

Ives, B. & Olson, M.H. (1985) "User involvement and MIS Success," Management Science, Vol. 30, No. 5, pp.586-603.

Jawad, A. (2003) "The Route to project success," Data Management Consultancy [Online]. Available from: http://www.cranfield.ac.uk/sme/rdman/rdcentre/people/docs/ajsli-ds.ppt [Accessed 10 July 2007].

Jayaranta, N. (1994) Understanding and Evaluating Methodologies, NIMSAD, A systematic Framework. Maidenhead: McGraw-Hill.

Johnson, S. (2002) Who moved my cheese?: An Amazing Way to Deal with Change in Your Work and in Your Life. NY: GP Putnam And Sons.

Jones, A. and Williams, L. (2006) "Where next for transformational government," The Work Foundation [Online]. Available from: http://www.workfoundation.com/prod-ucts/publications/azpublications/wherenextfortransformationalgovernment.aspx [Accessed 17 July 2007].

Jones, C. (1998) "Project Management Tools and Software Failures and Successes," CrossTalk: The Journal of Defense Software Engineering, July issue, Vol. 11, No. 6 [Online]. Available from: http://www.stsc.hill.af.mil/crosstalk/frames.asp?url=1998/07/too-ls.asp [Accessed 10 July 2007].

Karlsen, J.T., Andersen, J. Birkely, L.S., Odegard, E. (2006) "An empirical study of critical success factors in IT projects," International Journal of Management and Enterprise Development (IJMED), Vol. 3, No. 4.

Kauffman, S., (2000), Investigations. NY: Oxford University Press.

Keen, J. (2003) "Tough Decision: IT project selection has many pitfalls," CIO, (May 15), Vol. 16, No. 15.

Keen, P.G.W. (1981) "Value analysis: justifying decision support systems." MIS Quarterly, Vol. 5, No. 1, pp. 15–24.

Keen, P.G.W., (1975) A Clinical Approach to the Implementation of OR/MS/MIS Projects, Working Paper 780-75, Sloan School of Management, MIT.

Kemmis, S., & McTaggart, R. (Eds.) (1988) The Action Research Planner. Melbourne: Deakin University.

Kent, S.T. & Millett, L.I. (editors) (2002) IDs – Not That Easy: Questions About Nationwide Identity Systems. Washington, D.C.: National Academy Press.

Kerzner, H. (2004) Advanced Project Management: Best Practices on Implementation. NJ: Wiley & Sons, Inc.

Keuning, D. (1998) Management: A Contemporary Approach. London: Pitman Publishing.

King, J. (2003) "Survey shows common IT woes persist," ComputerWorld, Vol. 37, No. 25.

King, W.R. and Rodriguez, J.I. (1981) "Participative Design of Strategic Decision Support Systems: An Empirical Assessment," Management Science, Vol. 21, No. 6, pp. 717-726.

Kitiyadisai, K. (2000) "The implementation of IT in reengineering the Thai Revenue Department." In Information Flows, Local Improvisations and Work Practices, Proceedings of the IFIP WG9.4 Conference, Cape Town, South Africa.

Klein, H. K.; Hirschheim, R. & Nissen, H. -E. (1991) "A Pluralist Perspective of the Information Systems Research Arena." In: Nissen, H. -E.; Klein, H. K. & Hirschheim, R., (eds.) Information Systems Research: Contemporary Approaches & Emergent Traditions, North Holland, Amsterdam, pp. 1 – 17.

Kling, R. (1980). "Social Analyses of Computing: Theoretical Orientations in Recent Empirical Research." Computing Surveys, Vol. 12, No. 1, pp. 61-110

Kling, R. and Iacono, S. (1984) "Computing as an Occasion for Social Control." Journal of Social Issues, Vol. 40, No. 3, pp. 77-96.

Kling, R. and Scacchi, W. (1982) "The Web of Computing: Computer Technology as Social Organization." Advances in Computers, Vol. 21, 1982, pp. 1-90.

Kram, K. (1983) "Phases of the mentor relationship," Academy of Management Journal, Vol. 26, No. 4, pp. 608–25.

Kuhn T. (1970) The structure of scientific revolutions. 2nd Edition. Chicago: The University of Chicago Press.

Kuhn, T. (1974) The Essential Tension: Selected Studies in Scientific Tradition and Change. Chicago: University of Chicago Press.

Lake, C. (1997) Mastering Project Management. London: Thorogood Ltd.

Lam, L. (2003) Enterprise Risk Management: From Incentives to Controls. NJ: Wiley & Sons, Inc.

Lamb, G.M. (2005) "New plans are in store for an old number," CSMonitor [Online]. Available from: http://www.csmonitor.com/2005/0810/p12s03-ussc.html [Accessed 18 July 2007].

Laudan L. (1977) Progress and its problems: Towards a theory of scientific growth. Berkeley, CA: University of California Press.

LeFevre, R. (2006) Measuring public value from government IT, SearchSap.com [Online]. Available from: http://searchsap.techtarget.com [Accessed 13 November 2007].

Leffingwell, D. (2003) Managing Software Requirements. USA: Addison-Wesley.

Lemon, W.F., Liebowitz, J., Burn, J. & Hackney, R.A. (2002) "Information Systems Project Failures: a comparison of two countries," Journal of Global Information Management, Vol. 10, No. 2.

Levin, W.C. (1988) Sociological Ideas. 2nd ed. Belmont, CA: Wadsworth.

Lewin, K. (1946) "Action Research and Minority Problems," Journal of Social Issues, Vol. 2, pp. 34-46.

Lewis, C.P. (1997) Building a Shared Vision: Leader's Guide to Aligning the Organization. Productivity Press: USA.

Lientz, B.P. & Swanson, E. (1980) Software Maintenance Management: A Study of the Maintenance of Computer Application Software in 487 Data Processing Organizations. Reading, MA: Addison-Wesley.

Lim, C.S. and Mohamed, M.Z. (1999) "Criteria of project success: and exploratory re-examination." International Journal of Project Management, Vol. 17, pp. 243–248.

Lock, D. (2000) Project Management, 7th edition. USA: Gower.

Longworth, G. (1985) Designing Systems For Change. Manchester: NCC.

Loo, R. (2002) "Working towards best practices in project management: a Canadian study." International Journal of Project Management, Vol. 20, pp. 93–98.

Löwith, K. (1982) Max Weber and Karl Marx. London: George Allen & Unwin.

LSE (2005) "The Identity Project: an assessment of the UK Identity Cards Bill and its implications," London School of Economics, Available from: http://csrc.lse.ac-.uk/IDcard/identityreport.pdf [Accessed 12 May 2007].

Lucas, H. (1985) The Analysis, Design, and Implementation of Information Systems. New York. McGraw-Hill.

Lucia, A.D. & Lepsinger, R. (1999) The Art and Science of Competency Models: Pinpointing Critical Success Factors in Organizations. Pfeiffer: USA.

Lundin, R.A. & Christophe, M. (editors) (1998) Projects as Arenas for Renewal and Learning Processes. New York: Kluwer Academic Publishers.

Lynch, R. (2000) Corporate Strategy. Harlow, Financial Times, Prentice-Hall.

Lyytinen, K., Hirschheim, R.A. (1987) "Information systems failures: a survey and classification of the empirical literature," Oxford Surveys in Information Technology, Vol. 4, pp.257-309.

Maish, Alexander M. (1979) "A User's Behavior Toward His MIS," MIS Quarterly, Vol. 3, No. 1, pp. 39-52.

Mansfield, T. & Rejman-Greene, M. (2003) "Feasibility Study on the Use of Biometrics in an Entitlement Scheme for UKPS, DVLA and the Home Office," National Physical Laboratory, UK, [Online]. Available: http://uk.sitestat.com/homeoffice/homeoffice/s?docs2.feasibility_study031111_v2&ns_type=pdf [Accessed 12 May 2007].

Mansfield, T. (2001) "Biometric Authentication in the real world," National Physical Laboratory, UK, [Online]. Available: http://www.npl.co.uk/scientific_software/publications/biomet-rics/psrevho.pdf [Accessed 12 May 2007].

March, J. & Olsen, J. (1976) Ambiguity and Choice in Organizations. Oslo, Norway: Universitesforlager.

Markus, M.L. (1983) "Power, politics and MIS implementation", Communications of the ACM, Vol. 26 No. 6, pp. 430-444.

Marshall, C. & Rossman, G. (1995) Designing qualitative research. 2nd Edition. Newbury Park: Sage.

Martin, J. (1991) Rapid application development. Indianapolis, IN: Macmillan Publishing Co., Inc.

Maser, C. (1998) Vision and Leadership in Sustainable Development. St. Lucie Press: UK.

Mason R.O. (2005) "Putting 'Systems' Back into Information Systems: An Essay in Honor of Gordon Davis," Working Paper, May.

Mason, R.O. and Mitroff, I.I. (1981) Challenging Strategic Planning Assumptions: Theory, Cases, and techniques. New York: John Wiley & Sons.

Mathiassen, L. (1980) "Reflective Systems Development," Scandinavian Journal of Information Systems, Vol. 10, No.1&2, pp. 67-135.

Mathiassen, L. (1988) Oral presentation in the panel on "Information Systems Development Methodology Evaluation" in the Ninth International Conference on Information Systems, Minneapolis.

Matthews, W. (2002) "ID card plan assailed," Federal Computer Week, (February 18), Vol. 16, No. 4, p.16

McCall, J.A., Richards, P.K. and Walters, G.F. (1977) "Factors in Software Quality," Rome Air Development Center, RADC TR-77-369.

McCeary, L. (2004) 'The Fact of Fingerprints', The Resource for Security Executives [Online]. Available: http://www.keepmedia.com/pubs/CSO [Accessed 12 May 2007].

McCue, A. (2004) "ID cards set back by equipment failure," silicon.com [Online]. Available from: http://news.zdnet.co.uk/itmanagement/0,1000000308,391-53748,00.htm [Accessed 13 November 2007].

McManus, J. & Wood-Harper, T. (2003) "Information systems project management: The price of failure," Management Services, (May), Vol. 47, No. 5, p. 16.

McNeill, D., and Freiberger P. (1993) Fuzzy Logic. New York: Simon & Schuster.

Mechling, J. and Applegate, L. (2001) "Eight Imperatives for Leaders in a Networked World." The Harvard Policy Group on Networked-Enabled Services and Government, USA: John F. Kennedy School of Government.

Menkes, J. (2005) Executive Intelligence: What All Great Leaders Have. NY.: HarperCollins Publisher.

Meredith, J.R., & Mantel, S.J. Jr. (2003) Project Management: A Managerial Approach. 5th Edition. New York, NY: John Wiley & Sons, Inc.

Merriam, S. (1998) Qualitative research and case study applications in education. San Francisco: Jossey-Bass.

Metagroup (2002) 'Why Operation Projects Fail?' [Online]. Available from: http://www.metagroup.com [Accessed 12 November 2007].

Metcalfe, B. (1997) "Project management system design: A social and organisational analysis." International Journal of Production Economics, Vol. 52, pp. 305–316.

Miles, M.B. and Huberman, A.M., (1994) Qualitative data analysis: an expanded sourcebook. USA: Sage publications.

Miller, J & Moore, S. (1995) "A National ID System: Big Brother's Solution to Illegal Immigration," CATO Institute Policy Analysis, Washington, DC., [Online]. Available: http://www.cato.org [Accessed 12 May 2007].

Milosevic, D., Inman, L. and Ozbay, A. (2001) "Impact of project management standardization on project effectiveness." Engineering Management Journal, Vol. 13, pp. 9–16.

Mochal, T. (2007) "Top five reasons organisations fail at project management," TechRepublic [Online]. Available from: http://www.builderau.com.au/strategy/businessmanageme-nt/soa/Top-five-reasons-organisations-fail-at-project-management/0,339028271,339-272893,00.htm [Accessed 12 November 2007].

Moore, R.A. (2001) The Science of High-Performance Supplier Management: A Systematic Approach to Improving Procurement Costs, Quality, and Relationships. NY: AMACOM.

Morgan, G. (1983) Bevond Method. Beverly Hills CA.: Sage Publications.

Moussa, A. and Schware, R. (1992) "Informatics in Africa: Lessons from world bank experience," World Development, Vol. 20, No. 12, pp. 1737-1752.

Mouton, J. (2001) How to succeed in your Master's & Doctoral Studies. Pretoria: Van Schaik Publishers.

Mullaly, M.E. (2005) "Opening the Closet: Learning from Project Failures," Gantthead.com [Online]. Available from: http://www.gantthead.com/art-icle.cfm?ID=228722 [Accessed 20 June 2007].

Mumford, E. (1981) "Participative Systems Design: Structure and Method." Systems, Objectives and Solutions, Vol. 1, No. 1.

Munns, A.K. and Bjeirmi, B.F. (1996) "The Role of Project Management in Achieving Project Success", International Journal of Project Management, Vol. 14., No. 2, pp. 81 – 87.

Myss, C. (2003) Sacred Contracts: Awakening Your Divine Potential. New York: Three Rivers Press.

Nah, F., Lau, J. & Kuang, J. (2001) "Critical factors for successful implementation of enterprise systems," Business Process Management Journal, Vol. 7, No. 3, pp. 285-296.

NAO - National Audit Office (2006) "National Programme for IT in the NHS" Report by the Comptroller and Auditor General, HC 1173, http://www.nao.org.uk [Accessed 12 May 2007].

Naughton, E.D. (2004) "Measuring for project success," Systems Management, August 27.

Nelson, R. (2005) Project Retrospectives: Evaluating Success, Failure and Everything In Between. MIS Quarterly, September 2005, Vol. 4, No. 3.

Newman, M. and Sabherwal, R. (1996) "Determinants of Commitment to Information System Development: A Longitudinal Investigation." MIS Quarterly, Vol. 20, No. 1, pp 23-54.

NHS (2005) "National Programme for IT in the NHS," National Health Service [Online]. Available from: http://www.connectingforhealth.nhs.uk [Accessed 12 November 2007].

NZIM (2003) "When IT Projects Fail, Blame Management Major," New Zealand Management, Auckland, (March 5), p. 18.

O'Donnell, P.A., Arnott, D.R., & Gibson, M. (2002) "Data warehouse development methodologies: A comparative analysis." In F. Adam, P. Brezillon, P. Humphreys, & J-C. Pomerol (Eds.) Decision making and decision support in the Internet age. Cork, Ireland: Oak Tree Press, pp. 387-398.

OGC - Office of Government Commerce (2005) Managing Successful Projects with PRINCE2. UK: The Stationery Office.

Olle, T.W., Hagelstein, J., Macdonald, I.G., Rolland, C., Sol., H.G., Van Assche, F., Verrijn-Stuart, A.A. (1991) Information Systems Methodologies – A Framework for Understanding. 2nd ed. Addison-Wesley Company, The Bath Press, Avon.

Olugbode, M., Richards, R. and Biss, T. (2007) "The role of information technology in achieving the organisation's strategic development goals: A case study," Information Systems, Vol. 32, No. 5, pp. 641-648.

Orlikowski W.J. and Baroudi J.J. (1991) "Studying Information Technology in Organisations: research approaches and assumptions." Information Systems Research, Vol. 2, No. 1, pp. 1-28.

Orum, A.M., Feagin, J.R. and Sjoberg, G. (1991) "The Nature of the Case Study," in Orum, A., Feagin, J.R., and Sjoberg, G. (eds.) A Case for the Case Study. Chapel Hill: University of North Carolina, pp.1-26.

Ottosson, S. (2003) "Participation action research – a key to improved knowledge of management," Technovation, Vol. 23, pp. 87-94.

Page, S.B. (2002) "Project Management Methodology: The Key To Becoming a Successful Project Manager," gantthead.com [Online]. Available from: http://www.gantt-head.c-om/article.cfm?ID=135300 [Accessed 10 July 2007].

Paul, S. (1990) Strategic Management of Development Programmes. Switzerland: International Labour Office.

Peak, D., Guynes, C.S. & Kroon, V. (2004) "Information Technology Alignment Planning: a case study," Information & Management, (corrected proof version through sciencedirect.com).

Pearson, S.W. (1977) Measurement of Computer User Satisfaction. Ph.D. Dissertation, Arizona State University, Tempe.

Pettigrew, A.M. (1990) "Longitudinal Field Research on Change: Theory and Practice," Organization Science, Vol. 1, No. 3, pp. 267-292.

Pillai, A. S. and Tiwari, A. K. (1995) "Enhanced PERT for programme analysis, control and evaluation: PACE." International Journal of Project Management, Vol. 13, pp. 39–43.

PMI - Project Management Institute (2006) A Guide to Project Management Body of Knowledge (PMBOK Guide). Project Management Institute, Newton Square, PA.

Pollock, T. (1998) "Okay, you've failed. Now what?," Automotive Manufacturing & Production, (November), Vol. 110, No. 11, p. 10.

Popper, M. and Lipshitz, R. (1992) "Coaching on leadership," Leadership & Organization Development Journal, Vol. 13, No. 7, pp. 15–18.

POST (2003) "Government IT Projects," Parliamentary Office of Science and Technology [Online]. Available from: http://www.parliament.uk/post/pr-200.pdf [Accessed 12 May 2007].

Preece, R. (1994) Starting Research: An Introduction to Academic Research and Dissertation Writing. London: Pinter.

Privacy International (2004) "Mistaken Identity: exploring the relationship between national identity cards & the prevention of terrorism" (Interim Report) [Online]. Available from: www.privacyinternational.org [Accessed 02 August 2006].

Privacy Rights Clearing House (2006) "Identity Theft: What To Do When It Happens To You," Privacy Rights Clearinghouse [Online]. Available from: www.privacyrights.org/fs/fs17a.htm [Accessed 18 July 2007].

Putnam, L. (1983) "The interpretative perspective: An alternative to functionalism," In: Putnam, L. and Pacanowsky, M. (Eds.) Communication and organizations. Beverly Hills, CA: Sage.

Pyka, A. Küppers, G. (ed.) (2002) Innovation Networks: Theory and Practice. Cheltenham, UK: Edward Elger Publishing.

Quigley, J.V. (1995) Vision: How Leaders Develop It, Share It and Sustain It. McGraw-Hill Education: USA.

Radosevich, L. (1999) "Project Management Measuring UP," CIO [Online]. Available from: http://www.cio.com/archive/091599_project.html [Accessed 10 July 2007].

RAE and BCS (2004) "The Challenges of Complex IT Projects," A report by members of the Royal Academy of Engineering and the British Computer Society, The Royal Academy of Engineering, Available from: http://www.bcs.org/upload/pdf/complexity.pdf [Accessed 12 May 2007].

Rain, L. (2005) "IT Project Failures: Do not expect miracles," Purchasing Link (August issue) [Online]. Available from: http://www.naeb.org/Purchasing_Link/Commentaries/2005/August_LR_Commentary.htm [Accessed 12 April 2007].

Reiss, G. (1996) Programme Management Demystified: Managing Multiple Projects Successfully. London: Spon Press.

Remenyi, D. and Williams, B. (1996) "The nature of research: qualitative or quantitative, narrative or paradigmatic?" Information Systems Journal, Vol. 6, pp. 131-146.

Remenyi, D. William, B., Money, A. & Swartz, E. (1998) Doing Research in Business and Management: An Introduction to Process and Method. London: Sage.

Riley, J. (2003) "Big IT projects must include e-crime measures," Computer Weekly, (May 20), p. 5.

Robbins-Gioia (2002) "ERP survey results point to need for higher implementation success," Robbins-Gioia [Online]. Available from: http://www.robbinsgioia.com/news_events/012802_erp.aspx [Accessed 10 July 2007].

Robey, D. (1995) "Theories That Explain Contradiction: Accounting for the Contradictory Organizational Consequences of Information Technology," Proceedings of 16th International Conference on Information Systems, Dec., pp. 55-63.

Rosen, M. (1991) "Coming to Terms with the Field: Understanding and Doing Organizational Ethnography." Journal of Management Studies, Vol. 28, No. 1, pp. 1-24.

Rosinski, P. (2003) "Coaching across cultures," The International Journal of Coaching in Organizations, vol. 1, no. 4.

Royer, I. (2003) "Why bad projects are so hard to kill," Harvard Business Review, Boston, Vol. 81, No. 2, p. 48.

Rubin, J. (1994) Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests. USA: Wiley.

Russo, N.; Hightower, R.; and Pearson, J. (1996) "The failure of methodologies to meet the needs of current development environments." In N. Jayaratna and B. Fitzgerald (eds.), Lessons Learned from the Use of Methodologies: Fourth Conference on Information Systems Methodologies. Swindon, UK: BCS Publications, pp. 387–394.

Schewe C.D. (1976) "The management information system user: An exploratory behavioral analysis," Academy of Management Journal, Vol. 19, pp. 577-590.

Schmults, R. (2002) "By encouraging true project adoption, you can't fail," CRN, (May 13), No. 995, p.26.

Schofield, J.W. (1993) "Generalisability of Qualitative Research," In: Hammersley, M. (ed.) Social Research. London: Sage.

Scholl, H. J. (2001) "Applying stakeholder theory to E-Government: Benefits and Limits." In Proceedings of the 1st IFIP conference on e-Commerce and e-Government, October, Zurich, Switzerland.

Schramm, W. (1971) Notes on Case Studies of Instructional Media Projects. Washington DC: The Academy for Educational Development.

Schwaber, C. Leganza, G. and Daniels, M. (2006) "The Root of the Problem: Poor Requirements," Forrester Research, September.

Schwandt, T. A. (1994) Constructivist, interpretivist approaches to human inquiry. In Denzin, N.K. and Lincoln, Y.S. (Eds.) Handbook of qualitative research. Thousand Oaks, CA: Sage. (pp. 118-137)

Schwartz, S. (2004) "Tackling the challenges in government project management," Government Computer News, Vol. 1, No. 1 [Online]. Available from: http://www.g-cn.com/online/vol1_no1/25066-1.html [Accessed 13 November 2007].

Searle, J.R. (1995) The Construction of Social Reality. New York, NY: Free Press.

Seddon, P.B. (1997) "A Respecification and Extension of the DeLone and McLean model of IS Success." Information Systems Research, Vol. 8, No. 3, pp. 240-253.

Seidman, I. (1998) Interviewing as qualitative research: A guide for researchers in education and the social sciences. 2nd Edition. New York: Teachers College.

Sharp J. A. and Howard K. (1996) The Management Of A Student Research Project. 2nd Edition. Aldershot: Gower.

Shenhar, A.J., Dvir, D. (1996) "Toward a typological theory of project management." Research Policy, Vol. 25, pp. 607-623.

Shenhar, A. J., Dvir, D., Levy, O. and Maltz, A. C. (2001) "Project success: a multidimensional strategic concept." Long Range Planning, Vol. 31, pp. 699–725.

Shenhar, A. J., Levy, O. and Dvir, D. (1997) "Mapping the Dimensions of Project Success." Project Management Journal, Vol. 28, pp. 5–13.

Shetty, K.A.V. (2003) "Why most e-government projects fail," Businessline, Chennai, (November 15), p. 1.

Shih, S. (2001) Growing Global: A Corporate Vision Masterclass. Chichester: John Wiley & Sons.

Shoniregun, C.A. (2004) "An investigation of information systems project failure and its implication on organizations," International Journal of Services Technology and Management (IJSTM), Vol. 5, No. 1.

Sibley, E., H. (1986) "The Evolution of Approaches to IS Design Methodology." Paper presented at the Information Systems Design Methodologies: Improving the Practice - Proceedings of IFIP Working Conference on Comparative Review of Information Systems Design Methodologies, T. W. Olle & A. A. Verrijn-Stuart (Editiors.), North Holland, Netherlands, 5-7 May 1986.

Silverman, R.D. (2002) "Has the RSA algorithm been compromised as a result of Bernstein's Paper?," RSA Laboratories [Online]. Available from: http://www.rsa-security.com/rsalabs/node.asp?id=2007 [Accessed 09 April 2007].

Simon, J.L. (1995) "Foreign Workers, American Dream," New York Times, (June 1), P. A25.

Simpson,G. (2007) "ID cards to cost more than £5.6bn," Silicon.com [Online]. Available: http://www.silicon.com/publicsector/0,3800010403,39169101,00.htm [Accessed 15 November 2007].

Singer, L. (1995) "Public vs. Private-Sector IT Strategies," Government Technology [Online]. Available from: http://www.govtech.com/gt/96005?id=96005&story_p-g=2 [Accessed 09 April 2007].

Slevin, D.P., Stieman, P.A. & Boone, L.W. (1991) "Critical Success factor analysis for information systems performance measurement and enhancement," Information & Management, Vol. 21, pp. 161-174.

Srinivasan, A. (1985) "Alternative Measures of System Effectiveness: Associations and Implications." MIS Quarterly, Vol. 9, No. 3, pp. 243-253.

Stake, R.E. (1995) "Cases Studies" in Norman K. Denzin and Yvonna, S. Lincoln (eds.) Handbook of Qualitative Research. London: Sage Publications, pp. 236-247.

Standish Group (2003) "Chaos Chronicles," The Standish Group Int'l [Online]. Available from: www.standishgroup.com/pressarticle.php?id=2 [Accessed 12 July 2007].

Stankard, M.F. (2002) Management Systems and Organisational Performance : The Search for Excellence Beyond ISO9000. USA: Quorum Books.

Stanleigh, M. (2007) "The ISO 10006 and PMBOK Path to Successful Projects," Quality Digest [Online]. http://qualitydigest.com/IQedit/QDarticle_text.lasso?article-id=4556 [Acces-sed 09 April 2007].

Stepanek, G. (2005) Software Project Secrets: Why Software Projects Fail. NY.: Apress.

Stiglitz, J. (1999) Public Policy for a Knowledge Economy. Washington D.C.: The World Bank.

Stone, J. (1993) Inside ADW and IEF: The Promise and Reality of Case, New York: McGraw-Hill.

Stringer, E. (1996) Action Research: A Handbook for Practitioners. Thousand Oaks:Sage.

Sturgeon, W. (2004) "ID card opponents won't give up without a fight," Silicon.com [Online]. Available: http://www.silicon.com/research/specialreports/protecting-id/0,3800002220,39120270,00.htm [Accessed 09 April 2007].

Suikki, R., Tromstedt R. & Haapasalo H. (2006) "Project management competence development framework in turbulent business environment," Technovation, Vol. 26, pp. 723-738.

Sung, T.K. & Gibson, D.V. (1998) "Critical Success Factors for Business Reengineering and corporate performance: the case of Korean Corporations," Technological Forecasting and Social Change, Vol. 58, pp. 297-311.

Sviokla, J. & Wong, A. (2002) "Playing With Dynamite: How to Turnaround Information Technology Projects," DiamondCluster International, Chicago, USA [Online]. Available from: http://www.sviokla.com/Working%20Papers/IT%20turnaround%-20%20playing%20with%20dynamite1.pdf [accessed 10 April 2007].

Swanson, E.B. (1974) "Management Information Systems: Appreciation and Involvement," Management Science, Vol. 21, No. 2, pp. 178-188.

Swanson, E.B. (1988) "The Implementation Puzzle: Identifying the Pieces," Information Systems Implementation. Irwin:. Homewood Illinois, pp. 1-16.

Swart, D. (2006) "QRP M.M.I. introduces PRINCE2 in Sweden," BSCC The Network, Summer Edition. [Online]. Available: http://www.bscc.info/Pdf/SuEd2006.pdf [Accessed 13 September 2007].

Tansey, S.D. (2003) Business, Information Technology and Society. London: Routledge.

Tatnall, A. (2005) "Why some projects fail: reducing the risk of failure," Victoria University, USA [Online]. Available from: http://www.business.vu.edu.au/bco6656/20051/PM-5ax%20(Why%20Some%20Projects%20Fail).pdf [Accessed 10 April 2007].

Turban, E., McLean, E., & Wetherbe, J. (2004) Information Technology for Management: Transforming Organisations in the Digital Economy, 4th Edition. New Jersey: John Wiley & Sons, Inc.

Turbit, N. (2004) "Project Management Software Development Methodology," Project Perfect [Online]. Available from: (http://www.projectperfect.com.au/downloads/Info/info_methodology_implementation.pdf) [Accessed 10 April 2007]

Turner, J. R. (1999) The Handbook of Project-Based Management. 2nd Edition. McGraw-Hill Publishing Company.

Turner, J.R. (1993) The Handbook of Project-Based Management. London: McGraw-Hill.

UK House of Commons (2004) "Identity Cards" (Fourth Report of Session 2003-04) [Online]. UK Home Affairs [Online]. Available from: http://www.publications.parliament.uk/pa/cm200304/cmselect/cmhaff/130/130.pdf [Accessed 02 August 2007].

Ulrich, W. (1983) Critical Heuristics of Social Planning: A New Approach to Practical Philosophy, Bern: Paul Haupt.

Unhelkar, B., and Mamdapur, G. (1995) "Practical aspects of using a methodology: a road map approach," Report on Object Analysis and Design, Vol. 2, No. 2, pp. 34–36.

Van Maanen, J. (Ed.) (1983) Qualitative Methodology. London: Sage.

von Bertalanffy, L. (1968) General System Theory: Foundations, Developments, Applications. New York: Braziller.

Walsham, G. (1995) "Interpretative Case Studies in IS Research: Nature and Method," European Journal of Information Systems, Vol. 4, No. 2, pp. 74-81.

Wang, C. (1994) Techno vision: the executive's guide to understanding and managing information technology. New York: McGraw-Hill.

Warchus, J. (2002) 'Government IT Procurement Guidelines', *Computer Law & Security Report*, Vol. 17, No. 3.

Wastell, D.G. (1996), "The fetish of technique: methodology as a social defence", Information Systems Journal, Vol. 6 No.1, pp.25-40.

Weill, P. and Ross, J.W. (2004) IT Governance: How Top Performers Manage IT Decision Rights for Superior Results. Boston, Massachusetts: Harvard Business School Press.

Westerveld, E. (2003) "The project excellence model: linking success criteria and critical success factor," International Journal of Project Management, Vol. 21, pp. 411-418.

Westrup, C. (1993) "Information systems methodologies in use," Journal of Information Technology, Vol. 8, pp. 267–275.

Wheatley, M. (2005) "The Importance of Project Management: New research into the role of project management in a modern developed economy," Knowledge Train [Online]. Available from: http://www.knowledgetrain.co.uk/project-management-training-course-article004.php [Accessed 10 April 2007].

White, D. and Fortune, J. (2002) "Current practice in project management – an empirical study." International Journal of Project Management, Vol. 20, pp. 1–11.

Whitehead, J. (2000) "How Do I Improve My Practice? Creating and legitimating an epistemology of practice," Reflective Practice, Vol. 1, pp. 91-104.

Whitley, E.A. (1997), "Against method-ism: exploring the limits of method", Information Technology & People, Vol. 10 No.1, pp.31-45.

Whittaker, B. (1999) "What went wrong? Unsuccessful information technology projects," Information Management & Computer Security, Vol. 7, No. 1, pp. 23-30.

Whitworth, L., Kimsey-House, H., and Sandahl, P. (1998) Co-active Coaching. USA: Davies-Black Publishing.

Wideman, R.M. (1998) Project and Program Risk Management: A Guide to Managing Project Risks and Opportunities. USA: Project Management Institute.

Wideman, R.M. (2002) Comparing PRINCE2® with PMBoK®. Vancouver, BC, Canada: AEW Services.

Wilson, B. (2000) Systems Concepts: Methodologies and Applications. 2nd Edition. Chichester: John Wiley & Sons.

Wolstenholme E.F. (1990) System Enquiry-A System Dynamics Approach. Wiley, Chichester

Wood-Harper, A.T. and Fitzgerald, G. (1982) "A Taxonomy of Current Approaches to Systems Analysis." Computer Journal, Vol. 25, No. 1.

Wynekoop, J.L., and Russo, N. (1993) "Systems development methodologies: unanswered questions and the research-practice gap." In J.I. DeGross, R. Bostrom, and D. Robey (eds.), Proceedings of the Fourteenth International Conference on Information Systems. Orlando, FL, pp. 181–190.

Wynekoop, J.L., Russo, N.L. (1995) "Systems development methodologies," Journal of Information Technology, Summer, pp.65-73.

Xia, W and Lee, G. (2004) "Grasping the Complexity of IS Development Projects," Communications of the ACM, Vol.47, No.5.

Yin, R.K. (1989a) "Research Design Issues in Using the Case Study Method to Stuy Managmenet Information Systems," In: Cash, J. and Lawrence, P. (eds.) Harvard Business School Research Colloquium, The Information Systems Research Challenge: Qualitative Research Methods, Vol. 1.

Yin, R.K. (1989b) Case study research: Design and Methods. Newbury Park, CA: Sage publications.

Yin, R.K. (2003) Case Study Research – Design and Methods. London: Sage Publications.

Young, S. (2003) "Why IT projects fail," Computerworld, (August 25), Vol. 37, No. 34, p. 44.

Zalud, B. (2003) "Real or fake?" Security, (March), Vol. 40, No. 3, pp. 12-18.

Zimmer, B.T. (1999) "Project Management: A Methodology for Success," Hospital Material Management Quarterly, (November), Vol. 21, No. 2, pp. 83-9.

Zimmerman, J.S. (1992) "Using smart cards - a smart move (Access Control)," Security Management [Online]. Available from: http://www.securitymanag-ement.com [Accessed 01 July 2007].

Zmud, R. (1980) "Management of large software development efforts." MIS Quarterly, Vol. 4, No. 2, pp. 45–55

Zmud, R.W. (1979) "Individual differences and MIS success: A review of the empirical literature", Management Science, Vol. 25, No. 10, pp.966-79.

Zuber-Skerrit, O. (1992) Action Research in Higher Education: Examples & Reflections. London: Kogan Page Ltd.

Appendices

Appendix

A

Field Testing the Methodology

Implementing the Application

This section provides qualitative details on the phases of the proposed methodology from the UAE case study. It outlines and summarises the major activities undertaken in the implementation of the methodology in an attempt to explain how it was applied.

1.1 Initiation and organisation

Step 1.1.1 Form steering committee

The committee in the project included senior level authorities and key decision makers in the country. The committee was designed to meet quarterly to observe general progress with the project and offer guidance for its successful completion. Specific duties also included the review of the project plan, review of work progress, and decisions to direct and approve specific type of actions based on the problems identified and raised by the technical members.

Step 1.1.2 Appoint consulting company

Due to the nature of national ID projects and the level of expertise required in key management and technical areas, it was recommended to appoint a consulting company that gives expert opinion on key subjects. The government policies and legislation in many countries also require appointing a consulting company for large projects for which it was the case also in the UAE. This also allowed the client organisation to take a 'direction setting' role rather than doing the work themselves.

Step 1.1.3 Develop vision, goals and objectives

Lack of clear vision and objectives is a primary cause of projects failure as indicated widely in the literature and studies reporting failure cases. It was crucial to define clear goals and the strategic objectives in the initial planning and start up of the project mainly from brainstorming session and discussions.

The development of the vision was guided by the best practices with the below listed characteristics (*see for example* Lewis, 1997; Maser, 1998; Quigley, 1995; Shih, 2001):

- Common purpose and direction was reflected.
- The end result was clearly stated.
- Visions set an example for action.
- Good visions include the whole picture.
- Culture and climate was created.
- Forms the basis for priorities and goals.
- Good visions inspire and excite people.

Though it was viewed by some project members as a simple documentation process, it was stressed by the methodology that it is a consensus-building process in which the executive sponsors and the programme management committee, develop a common understanding of why the programme is taking place and to crystallise the business justification. This was translated into a project statement document. This helped drawing a boundary around the project scope as it attempted to capture agreement on the project definition before the team descended into detailed requirements study phase (*see for example* Hitchin & Ross, 1994; Lundin & Christophe, 1998; Paul, 1990). This document was used to guide all programme efforts and to keep the main goals at the forefront to help ward off scope creep.

It was also important that the project statement to be officially approved, and reference to the people giving the authorisation concerned. It promoted the understanding of requirements and commitment from the higher authorities. It also formed a contract among the parties concerned.

1.2 Current state assessment

Step 1.2.1 Study business process, organisation structure, technology, infrastructure, etc.)

At this stage, a high level strategic conceptual framework was developed by the project team, to (1) understand the complex external environment, (2) assess the internal environment with the aim to identify strengths and weaknesses , and (3) determine the critical success factors of the project. The current state assessment (CSA) activity covered the following main components:

- Business goals,
- Financial Limitation
- Technology
- Management
- Process and operations
- Organisational policies and procedures
- People
- Legal requirements
- Other external or internal factor that impact the organisation

It assisted the project team to gain a thorough understanding of the existing organisation, its operation and the problem areas. It involved several analysis methods such as observation, review of documents, interviews, and performance measurement (see for example Turban et al., 2003).

Step 1.2.2 Measure current state with vision, objectives (initial GAP analysis)

The project team reviewed and assessed the state of the current environment and evaluated it against the vision formulated during the previous stage to identify the strategic gap between the present state and the future vision (*see for example* Bocij et al., 2003; Tansey, 2003). The focus was placed on the functional and technical effectiveness of the applicable organisation, related processes and procedures and technology components.

Step 1.2.3 Prepare CSA report and recommendations

This step involves the documentation of the work carried out in reviewing the current state with a summary of the most important conclusions and recommendation. The analysis of the collected information served as an important building block for the future state design; the next.

1.3 Future state design

Step 1.3.1 Develop description of major functions (business process, organisation structure, technology, etc.)

This stage represented conducting several technical workshops in key project areas to record the future state design (FSD) in respect of the proposed population register and identification system components (e.g., biometrics, ID

card design and chip specification, security requirements, etc.). The outcome of this stage represented:

- A description of the system and its major functions.
- The use of biometrics for identification and verification purposes in the future system.
- A high level description of the identification card and its attributes.
- The management structure to support the system.

During this stage, some issues were deemed seriously important for successful implementation of the population register and identification system (e.g., enabling legislation, overarching security, communications, educating the public, etc.). These are explained in more detail in submission one.

Step 1.3.2 Prepare implementation implications and recommendations

In the developed report, five main critical success factors (CSF) were identified and first draft actions to address non-conformance have been formulated. These factors were related to the following:

- Card technology and security requirements
- Communications and education of the public
- Legislative requirements
- Transformation management
- External influences on the project

These factors were discussed in more detail in submission one. The status quo position pertaining the CSF was assessed by means of a specially designed questionnaire and the gap between the present and future states was used to develop action plans (see for example: Chung, 1986; Lucia & Lepsinger, 1999). Although all CSF's were deemed critical, it was agreed by both the steering committee and sub-technical committees that the buy-in of all concerned parties (stakeholders) would create a solid platform for the fulfilment of all the CSF's.

Step 1.3.3 Business case development (for approval)

Upon the completion of the step above, a formal presentation was delivered to His Highness the under secretary, the sponsor of the project, summarising the outcomes of this stage, and he asked the project team then to develop a proposal

to sell the project to the Cabinet of Ministries. This step was not initially in the design of the methodology but was later added because of the project requirements.

The vision and mission statements together with the strategic objectives provided the basis for case development as they outlined the project direction. The feasibility study also pinned out some other strategic considerations such as economical and political factors and the opportunities involved in each category (details of the feasibility study is provided in submission one). It also included a provisional financial model to get approval of the necessary funding. Figure A.1 depicts the investment justification model used in the UAE project.

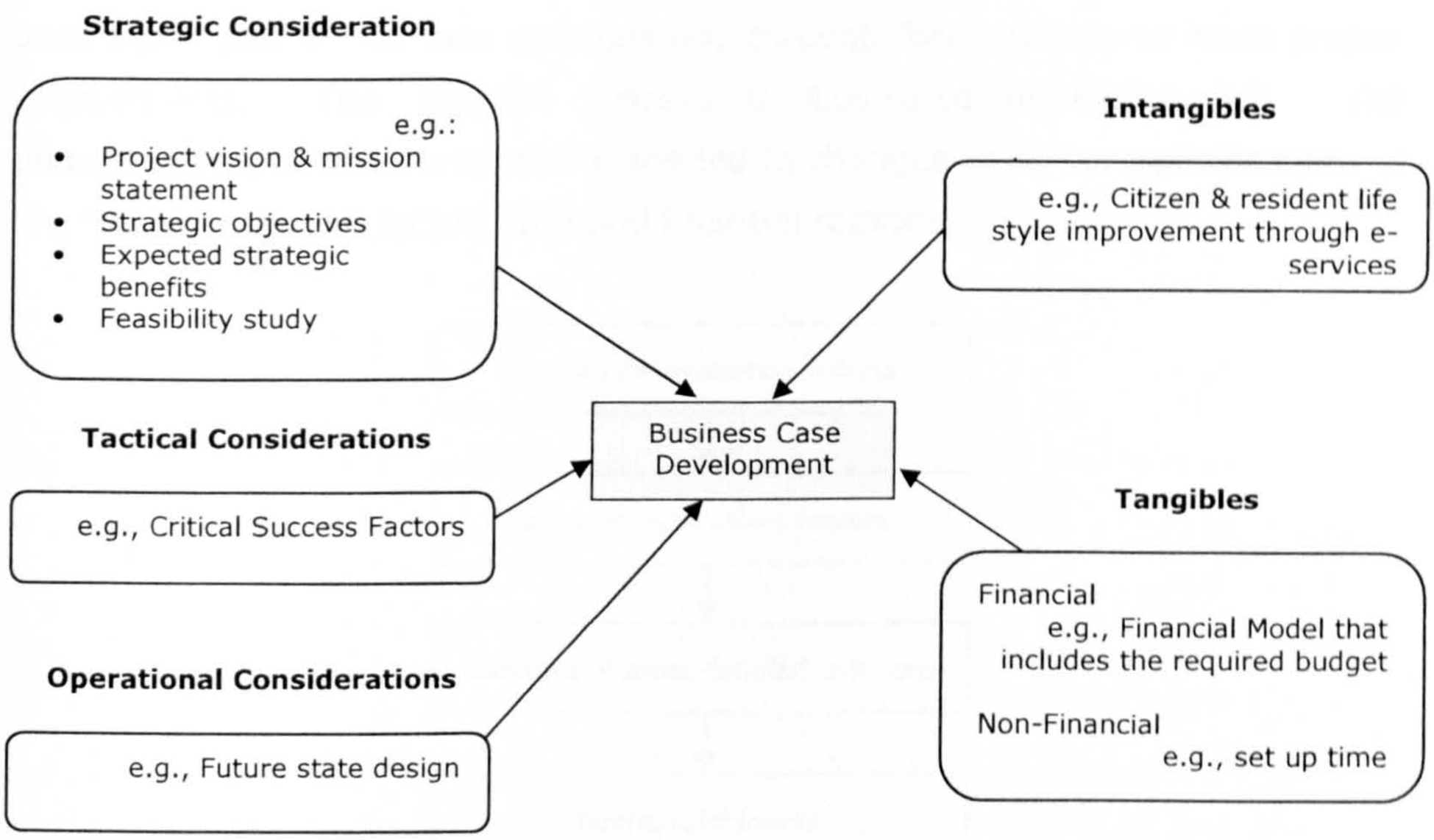


Figure A.1: Gunasekaran, et al.(2001) investment justification model mapped to national ID business case

1.4 Tendering and selection (vendor and/or consulting company)

Step 1.4.1 Tender preparation, and floating

The followed tendering process in this project was largely dependent on the Ministry of Interior's own tendering procedures, and was modified through discussions in focus groups to meet project requirements. The new tendering process proved to be very effective and comprehensive in terms of the overall

management of tender procedures. The tender was broken down into three main sections (administration, technical, financial).

The project team, the consulting company, and the legal and purchasing departments from the Ministry of Interior were involved in this activity. The tender was prepared and completed in three months period, and was floated once approved by the steering committee.

Step 1.4.2 Evaluation and selection

As the overall tendering management was adopted from the procedures within the Ministry of Interior, the process followed in the evaluation did largely come from the same procedures. However, the evaluation procedures were modified once again part of the new methodology through focus groups to meet project requirements. The adopted process is illustrated in Figure A.2. The understanding gained during this stage led to changes of certain specifications of the required solution for practical and financial reasons.

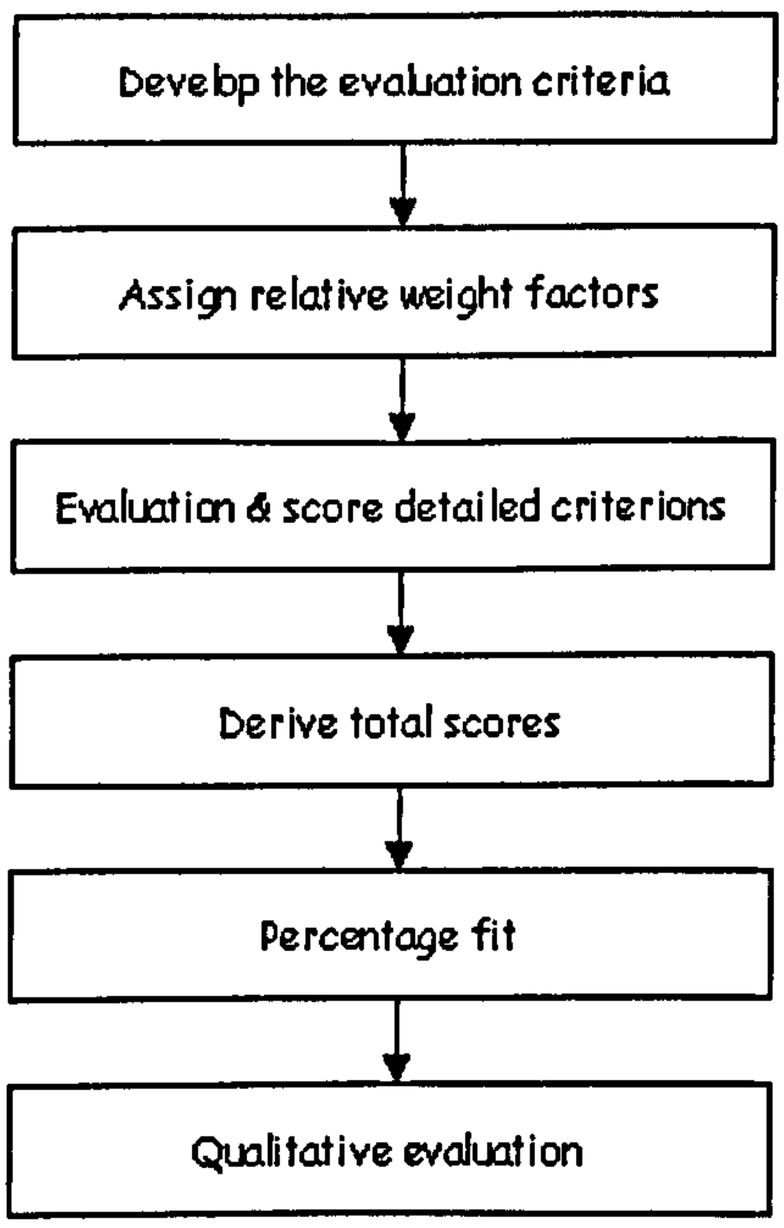


Figure A.2: evaluation methodology

The steering committee delivered a formal presentation to the sponsor with recommendations, with a very high level outline of the technical and financial information analysis. The sponsor approval triggered the next process.

Step 1.4.3 Contract formalisation

Over a month, several technical workshops were held with the selected vendor to address primarily the following issues:

- Identify both parties and the role of each in the agreement
- Project outputs and deliverables
- State payment terms, time expectations and other elements of the agreement
- The potential risks attached to the use of subcontractors, and quality management and assurance

The legal personnel from the Ministry of Interior picked up and refined so many contractual phrases that were perceived unclear in terms of the obligations and that did not allow the enforcement of the contract. However, the biggest problematic area was the second item related to requirements definition. It was extremely difficult to specify the detailed requirements at this stage. It was later found important that the system development methodology is defined in the contract, and that it must be iterative in nature.

This is to evaluate whether the client's requirements and expectations have been met. The contract was well written from a legal perspective; however, it lacked the technical details. The project deliverables were organised in a *'lot'* format. This was based on the traditional linear system development approach that the vendor was very much reluctant to change or compromise. The project scale and complexity did not allow this area to be addressed thoroughly at the time of writing the contract (see also step 2.3.2).

The literature shows that many organisations underestimate value of having well-defined contracts (Myss, 2003). A well defined contract can prove invaluable as the UAE project encountered several disputes over the delivery dates and option terms as well as litigation over complex details that were not explained in the contract. Further discussion on this subject is provided in Chapter 6 – Section 6.2.4.

However, studies shows that contracts are particularly difficult to establish for information systems projects for the many reasons as illustrated in Table A.1 (Bócij et al., 2003).

Table A.1: Reasons for establishing a comprehensive IS/IT contracts

Item	Description
Requirements definition	Difficulty to specify the requirements in detail at the outset of the project when the contract is signed.
Acceptable performance	Establishment of an acceptable performance at the outset is difficult because this depends on the combination of hardware and software
Responsibilities definition	Many different suppliers are involved and its often not clear where responsibilities for fixing problems may lie.
After project support	After the project is finished, critical errors can potentially occur and a support contract is required to ensure that they are remedied rapidly.
Escrow code	If a supplier's business fails, the system may be unmaintianable with the software programme, which may need to be put into safekeeping with a third party in a source code escrow agreement.

Source: Bocij et al. (2003)

Once the contract was signed off with the vendor, the second phase of the project commenced.

The second phase of the methodology consists of five components.

2.1 Programme management (organisation planning and control)

Step 2.1.1 Steering committee

The steering committee was the decision authority of the project. Critical decisions were referred to this committee. It was the responsibility of this committee to make resources and information available to the project, to resolve issues and to approve major changes. The steering committee consisted also of members from the consulting company, vendor company and the operational committee.

Step 2.1.2 Change control board

The literature shows that cooping with changes and changing priorities is perceived as the most important single problem facing the project management function (Heerkens, 2005; Meredith & Mantel, 2003; Reiss, 1995). A change control board was sit to evaluate the change requests for applicability and the impact to the project. The board decided the course of actions to take – implement, keep in view or discard the change request.

Changes to the project were managed through formal processes and procedures. Change Requests were filled in whenever changes were required to one or more approved baseline items. The purpose of this procedure was to enable a project to control changes that had an impact on the project progress, the overall system, time frame, or the cost of the project. Change requests were classified in four types depending on the nature and the financial impact as depicted in Table A.2.

Table A.2: Change Control Authorities

	Type of Change			
	Technical nature (No financial impact)	**Technical nature (With financial impact)**	**Contract Scope (No financial impact)**	**Contract scope (Financial Impact)**
Steering Committee	Accept or Reject	Analyse and Recommend	Accept or Reject	Analyse and Recommend
Change Control Board		Reject or Recommend to Project Sponsor		Reject or Recommend to Project Sponsor
Project Sponsor		Approve or Reject		Approve or Reject

Step 2.1.3 Conflict management committee

This step of the methodology was introduced later in the UAE project. Its importance was also emphasised by the officials in the GCC countries. At some points, conflicts were viewed more objectively. However, in the heat of a project, it was not uncommon to lose perspective as some conflicts distracted the team's progress. The course of action followed to resolve conflicts was often letting the participants in the conflict come up with the resolution.

However, if there were time constraints, or they were unable to resolve the conflict themselves, then the committee intervened to resolve the conflict for them. Finding appropriate resolutions to resolve conflicts was among the biggest challenges in the project. The committee (with senior officials' intervention when required) played a good role in improving the teams working relationship, and contributed to the overall quality of the project results.

Step 2.1.4 Setup PM office (consist also of financial controller + legal advisor)

This could be either a physical or virtual office depending on the magnitude of the project. In the UAE national ID programme the (physical) office was setup from the beginning with centralised pool of resources assigned to manage the different subsystems and phases of the project. This office became virtual with the establishment of the new organisation (Emirates Identity Authority) with resources coming from the functional units in the authority. The role of the office in the project and later in the organisation was to:

(1) Provide project management support,
(2) technical support and coordination,
(3) Recruitment and Training Support
(4) quality assurance,
(5) Provide consulting.

The project management office played a key role in promoting the application and deployment of the proposed project management methodology in this study. In addition, the office provided the opportunity for senior management to keep a closer eye on the schedule and budget of the projects. It was important to have senior management sponsorship and strong visible support for such concepts due to its role in the overall management of the project. To overcome the problem of

having limited project management resources within the organisation, a consulting company was hired to support the office functions.

Setting up a project management office was found to be very effective specially for a programme of this size, complexity, and the number of people and resources associated with it. Besides, it was also crucial that the office manages and coordinates different sub projects as they all needed to come together at one point of time.

Step 2.1.5 Develop project plan/schedule

The project plan was an integral part of the project management methodology, and more refined planning had to take place during the whole lifetime of a project. The general aims and objectives had to be defined and translated into concrete outcomes and products. The literature shows that a common rule in project management is that 80 percent of the time and energy is spent on defining aims and planning, and only 20 percent on the realisation of the products (Bunker, 2005).

This was considered to be a critical step as it formed the input for many subsequent activities in the project e.g., resource management, time management, cost management and risk management.

Linked closely with the *project charter* (step 2.1.7), the project plan contained detailed list of deliverables, detailed work plan, task based effort and duration estimates, and the project budget. It also incorporated other sub-projects upon which the main project was dependent. The plan was based on a logical breakdown of the overall programme effort into work breakdown structure (WBS) elements. The WBS served as the foundation for all programme planning and reporting.

Step 2.1.6 Project Monitoring and Control

Project monitoring and control is the process of knowing the progress the project is making toward accomplishing project objectives. It enabled the project to quickly return to the project plan if the project gets off schedule. Its purpose is to assure successful project implementation and quick response to problems and opportunities when they occur.

There are many approaches to project monitoring and control that vary in complexity from informal information flow in single projects to automated monitoring and information feedback systems in complex projects (further details on this is provided in submission 2). The project monitoring and control system should be designed to assist the project manager and the project management office, not to replace the need for the project manager's analysis and decision making.

An effective project monitoring and control system is based on the systems theory principles of having a clear standard of performance (i.e., the project objectives, work breakdown structure, and project plan) and providing clear, accurate, and timely feedback on project performance so effective action can be taken. Project monitoring and control systems in the UAE project were based on three fundamental steps:

1. Measure the progress toward project objectives. The measurement was easily accomplished by monitoring completion of each project task in accordance with the project schedule. The project tasks that are key to project success (for example, tasks on the critical path, a task with many tasks dependent on its completion, tasks where many people are involved, and tasks where new technology is used) can be identified as milestones. A milestone is a task whose progress the project managers need to monitor closely to assure its successful completion on schedule. Information on project task completion came from the sub projects managers responsible for the tasks (as identified in the responsibility assignment matrix). The information can come through formal or informal reports as part of task team status meetings or individual discussions with the project manager.

2. Analysis of the situation to determine the cause of any deviations in project progress. A systematic problem solving and decision making process that involves people with the information and project expertise and people who will implement the action was used.

3. Determine the action to be taken. Often the action was a contingent action or exploiting action that was established during the planning phase's potential problem analysis or potential opportunity analysis. The project manager normally initiated the action if a trigger has not automatically initiated it in the plan. On other occasions, the project

manager needed to perform additional analysis to determine the best course of action. The project statement and the project objectives were used to guide the decision.

Step 2.1.7 Develop project charter (clarifying the roles of client, vendor, and consultants, other entities in the projects, communications, coordination, etc.)

Based on the project statement document produced in phase one of the methodology, the developed charter document defined the scope of the project and its completion criteria. It provided an agreement of what the project was committed to deliver, the budget, time constraints, resources, and standards within which it must be completed. It specified the boundary of the project, what is in and what is out.

The charter defined the required project management and control structure (e.g., managing issues, quality management, scope management, risks management). These were explained in detail in submission 2.

The charter was a dynamic document that had changed during the life of the project to keep it consistent with the project realities. Changes to the boundaries, was presented to the project management office and approved by the steering committee through the change management process adopted in the project (see also step 2.1.2).

Step 2.1.8 Operational/Technical committee

The operational team consisted of the nominated project team members from the client organisation, vendor, and the consulting company. It was the task of the Operational Team to perform the daily activities and according to the project plan. This team was designed to:

- Consist of sub-teams that focus on specific areas, I.e. Population Register, ID Card, Security, etc,
- Perform the work and produce the identified deliverables,
- Meet on a regular basis to share information and to brainstorm solutions,
- Ensure project direction is consistent with the management goals and objectives,
- Identify risks external to the project,
- Take decisions in their sphere of control,

- Raises policy issues for consideration and resolution by the Steering Committee.
- Reviews project products (deliverables) and ultimately signs off on their delivery,
- Suggest solutions for confirmation to the Steering Committee.

2.2 Watch List & tools

This step was introduced at a later stage in the UAE project. It was found that project members started loosing sight of some important aspects in the project specially as they started getting much more workload with technically complex deliverables from the vendor.

The introduction of the watch list concept provided the project team with the opportunity to keep track of the main project areas and the critical success factors for the overall programme. This step was implemented in the form of regular meetings (every two months) to almost all project members to go over the project vision and goals, defined scope, business context and project objectives. This was an open forum for people to put their business and technical concerns on the table as well.

These meeting were sometimes included individuals from the client company and other national and international organisations who were invited to present their own experiences of running and managing projects. The stories and the different case studies provided the project teams with different perspectives to deal with the day to day activities and the pressure and challenges they faced.

Step 2.2.1 Critical success factors (periodical forums)

Critical success factors are measures which indicate the performance or efficiency of different parts of an organisation (Bocij et al., 2003). Researchers argue that that the application of CSFs is extremely important to reach targeted goals, values, and expectations, and that it should be closely monitored over the course of a project or process (Bocij et al, 2003).

Success factors incorporated those identified factors earlier in the literature contributing to project failures. In fact, studies show that many organisations and projects fail because they ignore or do not give enough attention to CSFs

(see for example: Nah et al., 2001; Peak et al., 2004; Slevin et al., 1991; Sung & Gibson, 1998; Westerveld, 2003).

In addition to those listed in step 1.3.2 in phase one, the following items were also considered CSFs and were discussed in the regular meetings:

1. Top management support (leadership)
2. Vendor Involvement & relationship
3. Schedule slippages
4. Sufficient Funding (budget)
5. Conflicts Management
6. Coordination, communication
7. *Team Building & motivation*
8. *Building and maintaining IT Workforce*
9. *Resources availability*
10. *User involvement and training*
11. *IT Contract terms*
12. *Standards*
13. *Citizen/Customer support, awareness & marketing*

Items from 7 to 13 needed dedicated management, and hence they were dealt with as sub projects. Team leaders updated the meeting of the progress each in his/her area of responsibility.

Step 2.2.2 Tools & techniques (to address and overcome risk factors)

Team leaders normally attended short (3-to-4 days) trainings that provided them comprehensive with an introduction to project management. It allowed them to understand how business initiatives are planned, managed and evaluated. Skills gained in these courses included building trust, empowering others, providing feedback, and managing conflicts.

Some tools and techniques that were identified during the implementation of the project were found to be of great assistance in improving the overall management tasks of planning and control.

- Lock's Model: to identify and manage project risk factor's influencing projects
- AIM FIRE: planning and controlling phases of the project

- SWOT: to identify conflicts and forces
- SMART: setting objectives
- Pareto 80:20 principle: focus and concentration on the problems areas
- McKinsey's 7S Model: to consider the impact of change on the project

Details of the application of these tools were provided in submission two. Overall, training project members to use such tools was found advantageous, as it provided them with models to think about and solve their day to day problems and assist in the project overall planning and management.

2.3 Project Methodology

Step 2.3.1 Project Management Methodology (may require customisation to fit with SD methodology, and any vendor constraints)

This stage involved revision of the project management methodology proposed in this study to fit with the system development methodology and any other possible vendor constraints. It was important to align the vendor deliverables with the overall project plan. To enrich the methodology and during the project implementation, project management literature was consulted on regular basis to find best practices, and templates for possible use. Submission 1 and 2 provide details of the templates employed.

Step 2.3.2 System Development Methodology

Not much information was disclosed to the client organisation with the regards to the development methodology followed by the vendor. The vendor kept it largely hidden from the client with the excuse that it is a proprietary work. The only information disclosed by the vendor was related to the deliverables of the project. Revising the development approach was observed to be associated with extra cost. Even though, the vendor was not welling to consider that option at all (see also step 1.4.3).

2.4 Requirements Validation & Development

End user involvement in the specification, design, development, and testing of deliverables is absolutely essential to promote broad-based process ownership and acceptance.

Step 2.4.1 Requirements verification

A requirement is different from a specification, in that requirement is the statement of the reason for what is being done or developed. A specification is the statement of the detailed characteristics of the project or product such as size or performance criteria. It was important that the stakeholders agree that requirements is appropriate and meets the government's needs and objectives.

The purpose of this step was to revisit the work completed in phase one to confirm and or update the requirements within the specified scope. Functional and performance requirements were validated through iterative demonstrations on mock-ups, screen layouts, and sets of look and feel presentations to ensure that they conform to the business requirements. The process followed by the vendor created interactive but long dialogues between the development and user teams to verify and validate requirements. Reviews were conducted during and at the end of each phase of the development process to determine whether established requirements, design concepts, and specifications have been met.

Step 2.4.2 Define evaluation criteria (this is a critical success factor)

Since the UAE national ID system was provisioned to become the most critical system in the country as the main central hub for population identity cross checking and service eligibility (i.e., online with 24/7 availability requirement), it was important that the overall system goes under a thorough quality evaluation. As widely quoted in literature that one of the principle causes of information system failure is when the designed system fails to capture the business requirements or improve the organisational performance (see for example: Avison & Wood-Harper, 1990; Bocij et al., 2003; Crain, 1992; Curtis, 1998 ; Harry, 1997).

ISO/IEC 9126 quality model was used to evaluate the system (see submission 4). The reason for choosing this standard was that it is an international standard and the results of the evaluation are more generalisable and make more sense if mapped to other projects of similar nature and complexity. The model sets out six exhaustive quality characteristics as illustrated in Figure A.3.

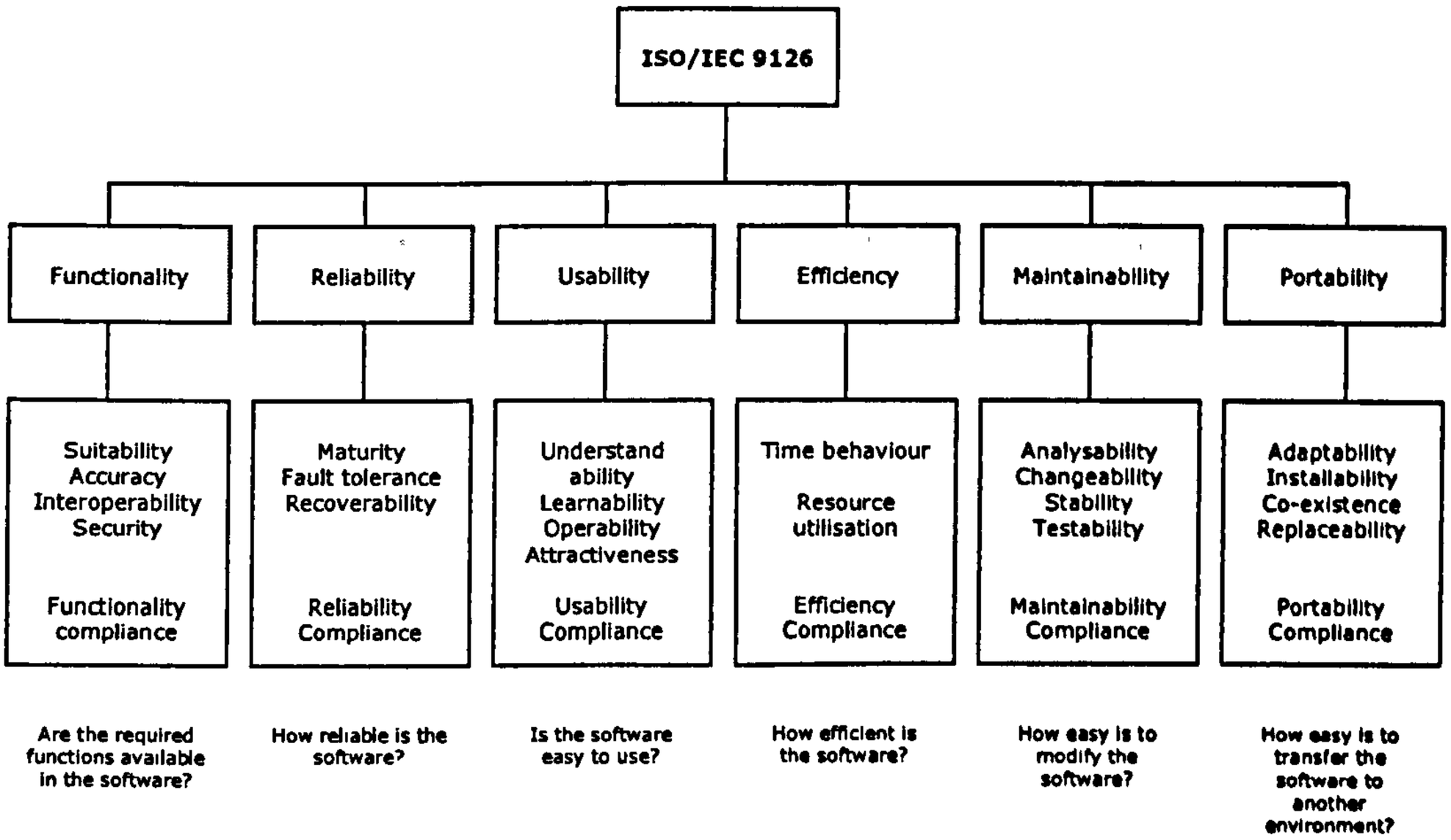


Figure A.3: ISO/IEC 9126 standards characteristics

The evaluation study contributed significantly in identifying many of the system deficiencies that required the vendor to address prior to the final acceptance and handover of the system. Besides, the use of quality framework provided a very useful and supportive methodological approach for going about software quality assessment. It acted as a comprehensive analytical tool and provided a more thorough view of the system's strengths and weaknesses.

It addressed a wide range of quality characteristics of the software products and processes enabling better description of software quality aspects and its importance. Arguably, if used as a guide in an early stage of the project it could have provided a sound basis for informed and rational decision making which could have contributed significantly to the delivery of a system which is properly addressing user requirements.

Step 2.4.3 Design & development

The design and development of the system followed the vendor's own development lifecycle approach as the client organisation did not have much of a say about it. The contract was not in favour of introducing any change in this regard.

During design and development phases, periodic reviews, inspections and walkthroughs were scheduled, conducted, tracked, and the results were reported

in accordance with the project's Quality Assurance Plan (detailed in submission 2). Primarily, peer reviews were conducted to review the work products and documentation developed by the vendor and to remove defects from the deliverables early and efficiently (see also Step 2.5.2).

Step 2.5 Evaluation of deliverables and system acceptance (execution and closure)

Step 2.5.1 Deployment

During this phase, the client organisation accepted the infrastructure system into production for trial operation. From a technical perspective this step was concerned with installation, operational assessment, and acceptance of the system. Users, operational support staff and technical experts from the consulting company were involved in accepting the system. From the business point of view, this step was concerned with ensuring that the client organisation is fully trained and prepared to use the new system. Following are some important tasks performed in this step:

1. deployment, operational support, and maintenance resources are adequate.
2. all user including IT support personnel training is completed
3. registration sites where the system will be operated are prepared.
4. the system at the designated sites is installed.
5. documentation and procedures are fully developed and tested.
6. periodic functional and physical configuration audits are conducted.
7. system security review is conducted.
8. adequate production and maintenance procedures are in place.

The implemented system went through various levels of testing performed by the technical committee members and the end users. Upon successful testing, the technical committee formally accepted each deliverable.

Step 2.5.2 Deliverables review (evaluation criteria) and acceptance

The project contract included up-front definition of project deliverables and a systematic approach to their development, refinement, and reuse over the course of the development life cycle (see also Devaux, 1999; Heerkens, 2005).

The literature exhibits the following key benefits of defining and focusing on project deliverables that were realised in the UAE project and the GCC countries (see for example Berkun, 2005; Jones, 1998; Kerzner, 2004; Lock, 2000; Page, 2002; Stankard, 2002; Sviokla & Wong, 2002; Wideman, 1998):

- Expectations are managed based on a clear definition of what the project will produce
- Deliverables are tangibles that can be tracked, reviewed, improved upon, and accepted.
- Team members have clear goals stated in terms of the work products that must be produced.
- Estimates, costs, risks, and quality are easier to define, measure and manage.

However, lack of technical detail on the above elements, created some conflicts as explained in steps 1.4.3 and 2.3.2.

Three main review types were adopted in the project to ensure deliverable quality:

Team review: a brief meeting during which two or more team members examined the output of one or more tasks, focusing on correctness, and completeness. A team review allowed team members working on different aspects of a deliverable to confer and maintain consistency. If an inconsistency was discovered, the review offered a forum in which each member could contribute to the resolution.

Formal review: a formal session to review a work product or deliverable, typically occurred at a major completion point. This internal review typically involved participants who were directly involved in the development process. This review allowed the work products to be revised in conjunction with other members of the team. This prevented the same defect from appearing in similar work.

Management review and approval: This review point occurred at the end of each stage to verify that deliverables are complete, correct, and consistent before work proceeds. The management review is conducted by members of the management and control structure and members of user management who were designated in the charter as approval authorities.

For system testing structured walkthroughs were used to test major project deliverables such as sub-system deliverables (biometric, card production, document management including the pilot). A walkthrough is a formal review of a product to ensure that it is complete, accurate, meets the requirements and conforms to standards (Beizer, 1995).

The emphasis during the walkthrough is on error detection, not correction since the system is supposed to conform to the specified requirements defined at earlier stages of the project (see for example Hetzel, 1993; Rubin, 1994). Thus, the system testing was based on structured forms designed to guide the review group in realising the benefits of the walkthrough testing. The forms included many driving factors that impact the quality of the product.

Step 2.5.3 Final System Acceptance & project Closure

The purpose of this step to assure that the project objectives were accomplished and all tasks completed; to close and balance all project financial record and accounts; and to share learning for application to other projects. The commencement of this phase was determined by the completion of all project deliverables. It involved a formal acceptance of the system.

The acceptance was mainly based on the results of the quality review and assessment exercise (ISO 9216 quality framework). The use of quality framework was found to be very useful and supportive methodological approach for going about software quality assessment. ISO 9126 framework acted as a comprehensive analytical tool to achieve a more thorough view of the system's strengths and weaknesses than could have been provided by less systematic approaches. This exercise contributed to a great extent in spotting some of the system deficiencies that were addressed prior to the final acceptance and handover of the system.

Assigned project managers from client and vendor companies worked together (with key stakeholders) and agreed the procedures to close down the project Agreements and obligations, with regards to system support, newer versions of the systems, open issues and disclaimers were documented and signed off by both parties. In principle, a structured project closure approach was followed to ensure that the project was brought to a controlled end, and it involved the following:

1. project sign-off (completion criteria)
2. project review (Project Plan, Cost, Quality/Scope: matching the initial requirements specified by the client with the final delivered product)
3. releasing the final deliverables
4. handing over project documentation,
5. ceasing supplier contracts and agreements,
6. releasing project resources,
7. knowledge transfer
8. formal communication of the closure of the project to higher management and other stakeholders
9. listing the lessons learned, (mainly documenting the challenges faced in the project and their resolution.)

Once the technical staff training was complete, the system was formally handed-over to the client organisation for future maintenance. A delivery notice was signed by the technical committee accepting the project final delivery and the closure of the contract.

Appendix

B Evaluation of the UAE Project

Success is a multifaceted concept. There is no agreement on a standard for assessing project success nor a universal framework for all kinds of projects. Although there are many possible dimensions of success, the iron triangle – compliance to scope, time and cost goals - remains the most common evaluation criterion in projects. However, such an approach has been criticised in the existing literature for being superficial and not providing enough variables for assessing project success (Lake, 1997).

The dominant understanding is that project success goes far beyond meeting time and budget constrains and should include the project's impact on customer and stakeholder benefits, organisational infrastructure and future opportunities (e.g. Shenhar et al. 1997, Atkinson 1999, Munns and Bjeirmi 1996, Lim and Mohamed 1999). Some of these new dimensions of success may be difficult to define and can only be evaluated years after the project completion.

As discussed earlier in Chapter 3, and despite extensive studies the concept of IS failure and its causes still remains ambiguous and ill-defined since project success rates have remained largely the same over the past 20 years. Many of the earlier studies only attempted to identify a single aspect of failing. A more pluralistic approach may bring better insights in assessing IS failure.

IS failure in this context refers to social values. These social values are presented in the IS by objectives and goals. Values are also part of the social and cultural aspects that represent personality traits. In practice, these values are shared amongst a group of people, known as stakeholders.

This research study buys into the Marxist and Weberian approach for assessing the stakeholders role (see also chapter 3 – section 3.3.2). The information system is taken to be an organisational arrangement which maintains basic similarities to other social institutions (Kling and Scacchi, 1982). As such stakeholder groups are recognised as those who have influence in the information system.

The stakeholders in the UAE project included: the sponsor, board of directors (who represented key decision makers in the country), senior managers, primary and secondary users of the system. Using the input of the identified stakeholder's group, the UAE project was evaluated using Lyytinen and Hirschhiem's (1985) four factors; expectation failure, process failure, correspondence failure, and interaction failure.

1. Expectation Failure

The UAE system had to meet the stakeholders group expectation. The project expectations were outlined in the project proposal as objectives (outlined in submissions 1 and 2). The objectives were primarily to build a modern and secure identity management system to enrol the whole population of the UAE. This objective was realised when the system was handed over to the client company and was confirmed with sign off by the sponsor.

2. Process Failure

There were mixed views on the presence of process failure. Process failure was present in the UAE project as the project exceeded its budget and passed the deadline. The vendor claimed that the project required more time for system development due to modifications of original requirements, but did not go over budget since the requirements were new ones. The client company placed emphasis on the importance of aiming for a successful system that encompasses the cultural aspects of the country.

The vendor also argued that the project was technically completed on time as they delivered their first pilot system according to the agreed project schedule. Nonetheless, the system was viewed to have several deficiencies from a business process perspective and that failed to capture vital social aspects of the country. This was an area that was ignored by the vendor. The requirements of the client organisation required major modification.

Social factors unlike technical factors are more difficult to resolve. The concept of user participation emphasises that users should participate during the system development process to achieve a successful system. In the UAE project, users' participation was inadequate as the vendor kept his development approach

hidden from the client company. If all stakeholders group had participated during the initial design stages of the system, some of the social factors may have been resolved, rather than revealed after the system implementation stage.

The literature shows that many projects defeat their project management control, as some factors can not be foreseen. In light of unclear vendor development methodology, changing requirements was clearly one of the biggest challenges the UAE project had faced. No matter what excuses one may bring up, the project failed to meet the original deadline and budget.

3. Interaction Failure

Interaction failure is where user satisfaction is not achieved. Ginzberg (1980) suggested that user's attitude can be assessed by whether he fully interacts with the Information System However, with some design of the IS does not require users to have full interaction. In the UAE project, the operational staff needed to use the system on daily basis for registration of the public. Management users used the system less frequently e.g., to generate reports. Therefore, one may also argue that it is difficult to assess the validity of interaction failure.

A short survey was conducted to measure user satisfaction. The user attitude was found negative (75%) when the first pilot system was introduced. This was mainly due to lack of training as the majority of users had no pervious computer experience. Extra training was vital. Some of the errors encountered by the users led to their frustration and dissatisfaction (See for example Submissions 2 and 4).

A second survey was conducted in the final system acceptance phase. This time survey results indicated more than 90% satisfaction. The remaining 10% of respondents stated reasons such as GUI interface and complicated system procedures for not being satisfied.

4. Correspondence Failure

Correspondence failure occurs when pre-defined objectives are not meet by the IS. This measure focuses on the management view of the IS. The literature says that sometimes the gaols set by management are too ambiguous and can be

difficult to maintain (Anderson, 1985; Avison & Wood-Harper. 1990; Checkland & Holwell, 1998). In the UAE system most of the objectives were met but the specified requirement constantly changed. In effect, the system could not be amended as easily and timely as often required.

To an extent, correspondence failure is similar to expectation failure in that both are failures to meet users expectations. In this case they were outlined as objectives and goals (what and how the system should perform) in the proposal. We can conclude that both types of failure are complementary.

The use of the ISO 9126 quality framework played a major role in improving the satisfaction of the top management as well as the end users towards the implemented system. The six quality characteristics and the 27 sub-elements of the quality model focused on the final product and on the identification of the key attributes of quality from the user's point of view. Basing the assessment on the ISO 9126 evaluation, the UAE project is perceived to be successful in the correspondence domain. Details of this assessment are provided in submission 4.

Overall, this study shows that the top three criteria (listed in descending order of importance) by which stakeholders judged a project's success were product, value as measured by actual usage; and cost which was ranked lowest overall. Although project managers and team members were more concerned with project process, users, not surprisingly, cared most about whether or not the resulting system could be used as intended.

This evaluation process revealed that stakeholders are much concerned with Lyytinen and Hirschhiem's expectation, correspondence and interaction factors than process failure. A discussion with many senior executives in the GCC countries revealed an interesting finding in this regard. They all seemed to be of one opinion about large government IT projects, and that it is the learning they gain from such initiatives. Despite the huge investment, they seemed to be most concerned about the learning their organisations get from implementing such projects. Executives from Western countries were seemed to give higher attention to cost and timeframe within which IT projects are executed as critical measurement criteria for the overall success of the project.

4. International Recognition

The UAE project received the *'Information Security Award'* at the Government Technology Summit in 2007. This comes in recognition of the competencies of the UAE national ID infrastructure, and the benefits it will bring to the public sector. The assessment, involving a panel of senior government officials from around the region considered a volume of 212 nominations for this award from 14 countries in the Asia Pacific region. This international recognition of the UAE project provides further evidence of its success.

Appendix

C

Critical Project Management Skills

Essentials Elements to the Success of PROMOTE Methodology

1. Leadership Skills

Leadership in projects involves influencing others through the personality or actions of the project manager. The project manager cannot achieve the project objectives on his or her own – results are achieved by the whole project team. The project manager must then have the ability to motivate the project team to create a team objective that they want to be part of. This will require both participation and consultation.

Project managers should be aware of the basic principles of group dynamics. These principles include, but not limited to:

- Use the project team's synergy and creative energy
- Be aware of people's current and developing roles and expectation
- Be prepared to deal with conflict and dissent
- Separate the content of the meeting from the group's process in the meeting
- Maximise participation throughout the project to gain the team's commitment

2. Communication Skills

Communication is the lifeblood of the project. As blood flows, it pumps oxygen through the body to sustain life. The same way, communication is the lifeblood of projects and organisations. Communication is vital for the progression of the project, identification of potential problems, generation of solutions, and keeping up to date with the requirements and the perceptions of the team.

To ensure the success of a project a lot of diverse information, including expectations, goals, needs, resources, status reports, budgets and purchase

requests, needs to be communicated on a regular basis to all the major stakeholders Including the client company, suppliers, sub-contractors, the project team and senior management..

3. Negotiation Skills

Project managers need to have to negotiate on a variety of project issues: availability and level of resources, schedules, priorities, standards, procedures, costs, quality and people issues. This skill is seen to be crucial.

4. Delegation Skills

A project manager need to communicate and clarify the overall project objectives to the team members, and should then further clarify the individual team members' role in achieving the objective by a process of delegation. Delegation is about empowering the project team and each team member to accomplish the expected tasks for his or her area of responsibility.

5. Problems Solving Skills

Project managers will inevitably face a number of problems throughout the project's life. It is important that the project managers gather as much information as possible about the problem in order to understand the issues as clearly as possible. The project managers should encourage team members to identify problem within their own tasks and try to solve them on their own initially.

6. Change Management Skills

It is important that the project managers have the skills to manage and control change. The impact change has on accomplishing the project objective must be kept to a minimum and may be affected by when in the project's life cycle the change is identified. Generally, the later the change is identified in the project

lifecycle, the greater its likely impact on achieving the overall project objective successfully.

If a project manager lacks an essential skill, but is given the job of managing the project for one reason or another, then the cost can be high as demonstrated in the UAE project. One may imagine the consequences of a person in charge who is not capable of establishing good rapport with people, who does not have the communication skills needed to liaise with the project team or other people involved in or affected by the project.

Uphill battles are sometimes seen as part of the job of project management. Small political empires exist within organisations. The choice of project managers may sometimes result from organisational politics. No matter how they come into the position, project managers often have to negotiate with people in the organisation who have work priorities that differ markedly from those of the project managers. Some staff the project managers may have to negotiate with may feel pulled different directions through other commitments or work. Others may be in the dark about the project, including managers with staff the project managers need, or the staff members' themselves may be uninformed.

7. Team Assembly

It was realised that keeping the core project management team membership as small as possible to be effective. Small teams work well. A well functioning team can produce results that far outstrip the potential output of its members. The concept is known as synergy, which means the total is greater than the sum of the part. Synergistic effect can be physical, in that a group of people together can move an object too large of one person to move. A similar effect may be observed in brainstorming, problem solving and other team activities.

Besides, the team selection, motivational and people skills of the project managers need to be exercised to identify and develop the best team possible, guide it in the right direction, and ensure its members benefit from the experience. As the project team assembles, and perhaps, replaces most of the core team, members will be briefed about the project. The remaining members of the core team may still be able to serve as advisers from time to time but their contribution to the project may not be seen to be sufficient to warrant appointing them to the project team.

The aim at this time is:

- To ensure the project team understands the purpose of the project
- To provide an opportunity for team members to contribute their own ideas
- To gain their commitment

8. Dealing with Project Team Anxiety

Project team members often feel considerable anxiety concerning their roles in the project. Particularly if they are new to management by projects they may feel more visible than in the management system they were used to. They may even feel concerned that their careers are on the line. In addition, they may feel unsure how their personal lives will be affected by their time on the project. In the UAE project, many of the project staff needed reassurance, support and answers to questions such as:

- What is the team expected to achieve
- What is my role, and the role of other teams members
- How will I do the work? – I have never done anything like this before
- When am I required – and for how long?
- Where am I expected to work – and who with?
- Who will do my normal work – or am I expected to do it as well as my project work?
- Who am I responsible to?
- Does my controlling officer know what is happening?
- Who do I see about problems – my controlling officer or the project manager?
- Do I have any authority on this project?
- Who will do my personal assessment?
- Who pays my salary – my division or the project?
- What happens to me when the project is finished?
- How will working on this project benefit me?

All project and organisation members were enrolled in training programmes such as the 'who moved my cheese' (Johnson, 2002), where such courses attempted to deal with teams anxieties and clarify uncertainties. The course acted as a powerful *change management agent*.

Appendix

D

Visited Countries and Consulted Officials and Experts

Table A-D1: VISITED COUNTRIES (OFFICIAL DELEGATIONS)

Region	No.	Government	Dates	Department
Europe	1.	UK	2004 2005	UK Immigration and Ministry of Interior
	2.	Italy	2006 2007	Ministry of Interior, Rome and Milan.
	3.	France	2004	Ministry of Interior
US	4.	USA	2004	Immigration, Florida
Asia	5.	Malaysia	2004 2007	National Registration Department, Kula Lumpur
	6.	Thailand	2007	Ministry of Interior
	7.	India	2003	Andra Pardesh Police GHQ, Hyderabad
	8.	Turkey	2006	Ministry of Interior, Istanbul
Middle East (GCC countries)	9.	Kuwait	Multiple and frequent visits	The Public Authority for Civil Information
	10.	Bahrain		Central Informatics Organization
	11.	Saudi Arabia		National Information Centre
	12.	Oman		Royal Oman Police
	13.	Qatar		Ministry of Interior
Africa	14.	Tunisia	2004	Immigration, and Ministry of Interior
	15.	Gana	2006	Ministry of Interior

Table A-D2: Consulted Officials and Experts in the Field

	Name	Job Title	Company	Phone	Email	Country
1.	Professor Viktor Mayer-Schönberger	Associate Professor of Public Policy	Kennedy School Of Government, Harvard University.	(617) 496-7299 (617) 496-5960	viktor_mayer-schoenberger@harvard.edu	USA
2.	Jerry Mechling	Director, e-Government Executive Education Project	Kennedy School Of Government, Harvard University.	(617) 495-3036 (617) 496-1722	jerry_mechling-fs-ksg@ksg.harvard.edu	USA
3.	Andy Kyte	Vice President & Research Follow Procurement Strategies	Gartner	+441784431611	Andy.kyte@gartner.com	UK
4.	Sharat Seth	Partner Consulting	KPMG	+971(4)4030300	sharatseth@kpmg.com	UAE
5.	Hisham Hany Elkeraby	Principal Consultant Consulting	KPMG	+971(4)4030300	helkeraby@kpmg.com	UAE
6.	Pat Abrahamsen	Chief Immigration Officer	Home Office UK Immigration Service	+02087570806	Pat.abrahamsen@homeoffice.gsi.gov.uk	UK
7.	Walter Hamilton	Chairman of the Board	International Biometric Industry Association	+(020)2938133	whamilton@saflink.com	USA
8.	Keith Asman	Detective Sergeant	Metropolitan Police	+(020)72302717	Keith.asman@met.police.uk	UK
9.	Prof. John Daugman	Computer Laboratory	University of Cambridge	+44(0)1223334501	John.daugman@cl.cam.ac.uk	UK
10.	Anuar Yaakub	M. Strategy Practice	MSC Technology Centre Strategy & Technology Consulting	+6(03)83181980	anuar@msctc.com.my	Malaysia
11.	Dr. Sulaiman A. Mirdad	E-Business Director	Communications & Information Technology Commission	+966 4618111	smirdad@citc.gov.sa	Saudi Arabia
12.	Rainer Rettig	Director Business Unit Secure ID	ACG Identification Technologies GmbH	+49(6123)791116	Rainer.rettig@acg-id.com	Germany
13.	Mohamed Seddiq Al-Mutawa	Vice President	ATLAS Telecom	+97126997500	mohamed.almutawa@atlastelcom.ae	UAE
14.	Tony Mansfield	Centre for Mathematics & Scientific Computing	National Physical Laboratory	+(020)89773222	Tony.mansfield@npl.co.uk	UK
15.	Joe O'Carroll	Director	Iridian Technologies	+41218048866 +41792137644	jcarroll@iridiantech.com	Switzerland
16.	Imad Kh. Malhas	Regional Manager	Iris Guard Incorporated	+962(6)5930986	imalhas@irisguard.com	Jordan
17.	Sanad S. Salim	Chief Computer Services	Ministry of Transportation Civil Aviation Affairs	+(973)321054	ssalim@bahrain.gov.bh	Bahrain
18.	Mark Lockie	Editor	Biometric Technology Today	+44(0)1491411224	m.lockie@btopenworld.com	UK
19.	Vanessa Singh	Business Development Manager	Visa	+971(4)3319690	singhv@visa.com	UAE
20.	Dr. Okan Geray	Manager, Strategic Planning & Implementation	Dubai E-Government	+971(4)3190369	Okan.geray@dubai-e.gov.ae	UAE
21.	Pierre R. Servettaz	Director	Gemplus	+971(4)3900150	Pierre.servettaz@gemplus.com	UAE
22.	Saleh Khamis Ghanim Al Kubaisi	Director of Information System Dept.	Ministry of Interior Information System Dept.	+974 4443962	salkubaisi@moi.gov.qa	Qatar
23.	Phillip R. Bertolini	Deputy County Executive/ CIO	Oakland County Michigan	+(248)8580815	bertolinip@co.oakland.mi.us	USA

	Name	Job Title	Company	Phone	Email	Country
24.	Joby Mathew	Regional Manager	ACG Identification Technologies GmbH	+971(4)3660421	Joby.mathew@acg-id.com	UAE
25.	Victor Lee	Senior Consultant	International Biometric Group	+(212)8099491	vlee@biometricgroup.com	USA
26.	Fadi Abdul Khalek	Vice President Public Service Industries	ORACLE	+971(4)3909000	Fadi.abdulkhalek@oracle.com	UAE
27.	Kristian Honkanen	Business Development Manager	Gemalto	+358(0)989414381	Kristian.honkanen@gemalto.com	Finland
28.	Petri Lahonen	Field Marketing Manager - Marketing ID Europe	Gemalto	+358(0)989414315	Petri.lahonen@gemalto.com	Finland
29.	Hatmuth Von Maltzahn	Managing Director	L-1 Identity Solutions	+49(0)234978733	hmaltzahn@L1id.com	Germany
30.	Tony Collings	Director	Electronic Commerce Associates Limited	+ 01189767544	tonycollings@ecalimited.co.uk	UK
31.	Angela R. Williams	Wireless Communications Technology Analyst	Northrop Grumman Corporation Information Technology	+7039027803	Angela.r.williams@ngc.com	Chantilly
32.	Markus Hartmann	Senior Consultant	HJP Consulting	+4952516888631	Markus.hartmann@hjp-consulting.com	Germany
33.	Dr. Daniel R. Walsh Finstsmm	Managing Director	Total Trust Solutions Expanding your Business Horizons	+441707273051	Daniel.walsh@total-trust.com	UK
34.	Robert C.S. Wilson	Operations Manager	Dubai School of Government	+971(4)3304444	Robert.wilson@dsg.ae	UAE
35.	Ibrahim Tayfour	Principal Consultant	Smart Square	+971(4)3900930	tayfour@smartsquare.com	UAE
36.	Riadh A. H. Samarrai	Director Information Technology	AD Customs	+971(2)6730654		
37.	A. Kareem Ahmed Al Rashed	Acting Director Small & Craft Industries	Ministry of Industry & Commerce	+973(1)7568032	aalrashed@industry.gov.bh	Bahrain
38.	Rashed Lahej Al Mansoori	Manager – IT Advisory Services	Mubadala Development	+971(2)6160099	ralmansoori@mubadala.ae	UAE
39.	Hadi Hussant	Project Manager	Sagem	+971(2)6455021	Hadi.hussant@sagem-me.ae	France
40.	Robert Moran	Bus. Development Manager	Injazat	+971(2)6992700	Rob.moran@injazatdatasystems.com	UAE
41.	Ghanim Ibrahim M.A.	Dubai International Airport Manager, Operating & Tech. Support, IT Section	Ministry of Interior Naturalization & Residency Administration – Dubai	+971(4)2161546	ghanim@dnrb.ae	UAE
42.	Rashid M. Al Fandi	Executive Director for Banking Operations Department	Central Bank Of The UAE	+971(2)6668486 +971(2)6085424	uaecbbod@cbuae.gov.ae	UAE
43.	Yousef M. Al Awadi	IT Manager	Securities & Commodities Authority	+971(2)6277888	yousefm@sca.ae	UAE
44.	Hassan Al Serkal	Information Technology& Compliance Manager	Dubai Financial Market	+971(4)3055555	halserkal@dfm.co.ae	UAE
45.	Rashed Lahej Al Mansoori	Manager – IT Advisory Services	Mubadala Development	+971(2)6160099	ralmansoori@mubadala.ae	UAE
46.	Khalid Ahmed Abu Shamleh	Project Manager	AD Systems & Information Committee	+971(2)6717000	Khaled.shamleh@adegov.ae	UAE

	Name	Job Title	Company	Phone	Email	Country
47.	H.E. Dr. Hashem Al Refaei	Director General, e-Gov Authority (EGA)	Government of Ras Al-Khaimah	+971(7)2337551	h.arrefaei@rak.ae	UAE
48.	Ashraf Radwan	Regional Director-GCC	Logic M. Consulting	+971(2)6732826	Ashraf.radwan@logic-consulting.com	UAE
49.	Ehab Sawalha	Consulting Manager	Tala Abu Ghazaleh & Co.International	+971(2)6724425 +971(2)6724426	esawalha@tagi.com	UAE
50.	Mohmad Ahmed	Deputy General Manager	Informap Production	+971(4)3322299	informap@informap.ae	UAE
51.	Mutaz Zeidan	G.M.	Smart Systems	+971(2)6764100	Mzeidan@eim.ae	UAE
52.	Ibrahim A. Al Mosa	Acting Exec. D. Finance & Admin	General Authority for Health Services for the Emirate of AD	+971(2)4493333	ialmosa@gahs.ae	UAE
53.	M. Ifthikhar	Project Manager	Network International LLC.	+971(4)4053176	mohammedNI@network.ae	UAE
54.	Abdulla Al Jenaibi	Director	Fanna Technology	+971(2)5501717	Abdulla@fannatech.com	UAE
55.	Salim Abdalla	CEO	Global Information Technology	+971(4)3244997	sabdalla@git.ae	UAE
56.	Robert G. Faissal	Director	Millennium Steel &Wire	+971(4)3432941	rgfaissal@mswme.com	UAE
57.	Edward Harman	Bus. Development Manager	Strategic Thought Group	+44(0)2084104090	Edward.harman@strategicthought.com	UK
58.	Farouk Mahfouz	Deputy G. M.	Bayanat	+971(4)2826682	farouk@bayanaat.com	UAE
59.	Robert Ainey	e- ID Bus. M.	ACI Worldwide Limited	+973(17)535510	aineyr@aciworldwide.com	UK
60.	Andrew Hudson	Director, Leadership Program	International Emirates Management for Quality	+971(2)6659500	a.hudson@iemq.ae	UAE
61.	H.E. M. Ahmed Bin Abdul Aziz	Undersecretary – Planning Sector	Ministry of Economy	+971(2)6268878	mbinabdulaziz@economy.ae	UAE
62.	Faras Al Jabi	G.M.	Itqan Al Bawardi Computers	+971(2)6767666	fajabi@itqan.ae	UAE
63.	Hatem S. Al Hinawi	G.M.	Explorer Computer	+971(2)6714242	hinawi@eim.ae	UAE
64.	Tom Thompson	Senior M. Technology & Security Risk Services	Ernst & Young	+971(2)6277522	Tom.thompson@ae.ey.com	UAE
65.	Jonas Andersson	Director, Smart ID	Precise Biometrics	+46(46)311100	Jonas.andersson@precisebiometrics.com	Sweden
66.	Malik Melhem	General Manager	Reach Consulting	+971(2)6765722	mmelhem@experts.ae	UAE
67.	John Mcgaw	Managing Director	Golden Oryx Limited	+971(4)3498253	jmcgaw@emirates.net.ae	UAE
68.	Basim M. Darwish	Bus. Development M.	Computer Network Systems	+971(2)6442888	Basim.darwish@cns-me.com	UAE
69.	Khalid Abdulla Ahmed	Manager, Gov. Services Operations	Tecom Investments	+971(4)3911111	Khalid.abdulla@tecom.ae	UAE
70.	David Birch	Director	Consult Hyperion	+44(0)1483301793	David.birch@chyp.com	UK
71.	Tan Keng Boon	Exec. Director	Advanced Card Systems	+(852)27967873	kengboon@acs.com.hk	Hong Kong
72.	Georgina Juhasz	Managing Director	The Human Angle	+971(4)3902797	georgina@thehumanangle.com	UAE
73.	Charlie Lei Ding	Managing Director	Sign Assured	+44(0)1517284813	c.ding@signassured.com	England
74.	Ayad Sleiman	Deputy Director of Operations	Science Applications International Corporation		sleimana@saic.com	
75.	Dr. Mohammed Alltaleb	M. Partner & President	DMA Consulting	+966(3)8310333	malltaleb@dma-consulting.com.sa	Saudi Arabia
76.	Roman Tuma	Consultant	Active identity Digital, Identity Assurance	+6(5)63956888	Roman.tuma@actividentity.com	Singapore

Appendix

E International Recognition

In recognition of the author's contribution, during the course of this research, to the existing knowledge in the field of project management and the implementation of advanced identification technologies, he received three international awards.

(1) ID Outstanding Achievement Award - 2006

iD People

MOVERS & SHAKERS OF THE AUTO ID BUSINESS

ID WORLD INTERNATIONAL CONGRESS

ID PEOPLE AWARDS 2006

Presented at the fifth ID WORLD International Congress in Milan, Italy. The ID People Awards - the Oscars of the auto ID industry – are assigned each year to outstanding members of the ID Revolution Community who have distinguished themselves during the last 12 months for commitment, leadership, creativity and innovation. The awards are the world's most highly regarded recognition of the contributions by the thought leaders, innovators and pioneering adopters that drive the development of auto ID technology. The award also recognised the author's work carried out part of the EngD research study; the establishment of the G2C e-Government authentication concept part of the UAE national ID programme which is expected to revolutionise public services in the country.

(2) Who's Who of Government Technology Middle East Award - 2006

ICTDAR
Information & Communication
Technologies for Development
in the Arab Region

Presented by UNDP (United Nations Development Programme) and the League of Arab States, in recognition of the author's contributions to the IT management field.

(3) Science and Research Innovation Award - 2007

Presented by one of the most prestigious institute in the Arab Countries (Dubai Cultural Council) located in Dubai, operated and regulated by the UAE Government, in recognition of the author's contributions to advancing project management practices. This evaluation was based on the project management report submitted by the author, and consultation with the UAE National ID Card Project, and the 3 GCC countries feedback on the methodology.

Appendix

F

Personal Profile

Table A-F1: Submissions Evaluation

Project Features/Submission No.	1	2	3	4	5
Industrial relevance (IT Industry, Government, Project Management)	◎	◎	◎	◎	◎
Demonstration of innovation in the application of knowledge to the engineering business	○	○	○	○	◎
In-depth analysis at the outset of alternative options... literature survey, benchmarking	○	◎	◎	○	◎
Analysis at conclusion of extent of meeting objectives, learning from the project.	○	◎	○	◎	◎
Demonstration of significant contribution to the performance of the engineering business	○	◎	○	◎	◎

Table A-F2: Personal Competency Evaluation

Competencies	1	2	3	4	5
Expert knowledge of an engineering area	○	◎	○	◎	◎
Appreciation of industrial engineering and development culture	○	○	◎	◎	◎
Project and programme management skills	◎	◎	○	○	◎
Teamwork skills	◎	◎	○	◎	◎
Leadership skills	◎	◎	○	◎	◎
Oral communication skills	◎	◎	◎	◎	◎
Written communication skills	◎	◎	◎	◎	◎
Technical organisation skills	◎	◎	○	◎	◎
Financial engineering, project planning, and control	◎	◎	○	○	◎
Application of skills to new and unusual situation	◎	◎	○	◎	◎
Ability to search relevant information sources	◎	◎	◎	◎	◎
Ability to develop optimal solutions to complex engineering problems	○	◎	◎	◎	◎
Possibility of wider publication	◎	◎	◎	◎	◎

Relationships:* ◎ Strong ○ Medium △ Weak

* These symbols show the strength of the relationship with the project features and competencies.

Table A-F3: Research Study Evaluation

Project Features/ Submission No. 5	**References**
Industrial relevance	• The work carried in this research study is largely relevant to the IT and Consultancy industries with a focus on the implementation of National ID programmes. The developed methodology may be generic and relevant to other government IT projects. See also Chapter 8.
Demonstration of innovation in the application of knowledge to the engineering business	• The research process followed, the review and evaluation of exiting knowledge, analysis and modification with new primary data to bring about improved performance have demonstrated how the author has applied innovation to the application of knowledge in the IT systems projects arena. • International recognition awarded to the author verified the novelty and value (Appendix-E).
In-depth analysis at the outset of alternative options… literature survey, benchmarking	• Analysis of the alternative options and recommended actions and solutions were based on various methods such as literature review, survey, focus groups, and discussions with government officials and experts and visits to many countries in Asia, Europe, Africa and US, as well as through attendance and active participation in international conferences.
Analysis at conclusion of extent of meeting objectives, learning from the project.	• The key aim and objectives of this study - as presented in Chapter one - were to (1) understand the factor influencing successful IT projects implementation, (2) assess existing methodologies, (3) development and application of an innovative project management methodology. (1) The research study identified several factor influencing the successful implementation of large IT projects, most of which were management and implementation related (discussed in chapter three). (2) The results from many years of IT implementations were found to do not lead to much faith in the existing methodologies for ensuring success. The only argument in their favour was that even fewer projects may succeed without them. And hence they are often used to guide and support projects. Many of the methodologies used were found to be propriety and/or hybrid versions of the main international standards in this area. Overall, analysis of the key methodologies revealed some weaknesses but also some commonalities.

	(3) The PROMOTE methodology developed part of this EngD research study was applied mainly in the management of the UAE national ID card programme implementation. The evaluation of the UAE project revealed that stakeholders have viewed it as a successful initiative (Appendix-B). The methodology was also followed in three GCC countries. These experiments provided the researcher with the opportunity to assess the value of the methodology. Officials in the GCC user group indicated that the methodology supported them in two major categories: overall project management and management reporting. The research study identified many learnings and consideration factors to be heeded when implementing large and complex IT projects. These factors were both management and technology related. This was discussed in Chapter 6.
Demonstration of significant contribution to the performance of the engineering business	• The evaluation of the UAE project revealed a good project implementation (Appendix-B) • International / Industry recognition of the work conducted in this research study (Appendix-E).

During the course of this engineering doctorate the author had the opportunity to acquire knowledge and experience as well as improve his skills and abilities in a broad set of areas. The critical thinking imposed by the EngD required me to explore, analyse, evaluate and critique a wide range of subjects and most importantly my own actions in the course of this research. The following table summarises some of these competencies developed.

Table A-F4: Detailed Personal Competency Evaluation

Competencies	References
Expert knowledge of an engineering area	• Research activities conducted in this study covered the theories and practices related to Project Management and IT systems development, which was subsequently used for the development of an innovative methodology for managing large scale government IT projects (see Chapter 4). • Obtainment of CITP Fellowship grade from the British Computer Society in recognition of the author's competencies based on SFIAplus Level 7 framework. Further details of this Fellowship grade is provided in Section A-F7 below.
Appreciation of industrial engineering and development culture	• This competence was gained through visits to many countries around the world, surveys and interviews with government officials and experts in the field, observation and active participation in the UAE project as well as through regular meetings with officials from GCC countries, and the review and analysis of the existing literature. This provided the author with the understanding of various types of cultural aspects (See for example: Submission 2, Submission 3, Submission 5).
Project and programme management skills	• The author played critical roles in the project management and implementation of many strategic IT initiatives in the government of the UAE since 1999. • In the UAE national ID project, the author was an active participant in the project management committee, and facilitated the implementation of the new PROMOTE methodology that he has developed. • Being a PMP certified from the PMI institute, the author also successfully completed another international project management curriculum and the associated exam which qualified him to obtain a professional membership of the Chartered Association of Business Administrators in Canada (http://www.charteredaba.org) and certified with the title **Chartered Project Management Consultant** (CMPC) grade. See also Section A-F8 below.

Application of skills to new and unusual situation	• Development of the management methodology for managing project activities in complex and large IT initiatives. • Tools and techniques proposed part of the PROMOTE methodology for planning and controlling activities. • Development of G2C e-authentication concept (Submission 3) for the verification of online identities. • Application of ISO 9126 Quality Framework for revealing system deficiencies/improvement requirements (Submission 4). • Working closely with various projects attempted to resolving or putting solutions to emerging requirements e.g., enrolment strategy and plan, government systems integration committee, GCC technical committee, etc.
Ability to search relevant information sources	• This competence was developed through literature review, and was demonstrated in the various deliverables of this research study i.e., submissions and publications, etc. (See also Section A-F2: Publications) • Use of the web, and on-line databases such as Proquest and Science Direct through Athens for academic material. • My extensive reading also showed me that practitioners need to research continuously to serve their organisation and to keep themselves active and up-to-date in the field. This EngD was a great opportunity to learn how to research. Perhaps the most significant learning here was the experience of using different methods to conduct the research. The EngD work basically gave me the confidence to conduct research, looking at the "whats, hows and whys" whilst viewing it as a continuous process.
Ability to develop optimal solutions to complex engineering problems	• The development of the PROMOTE Methodology • The proposed techniques and tools (Chapter 4 – Section 4.2.9) • Application of the ISO 9126 quality framework to pinpoint systems deficiencies/improvement opportunities (Submission 4) • G2C e-government authentication framework
Possibility of wider publication	• The concepts and the work undertaken in this research study were presented and incorporated in many journals articles and proceedings of many conferences. Details of these are presented in the following Section A-F2.

A-F2: JOURNAL AND CONFERENCE ARTICLES

1. Al-Khouri, A.M. (2007) "Change Management in IT Projects: Practical Approaches for Managing the People Dimension," International Journal of Humanities and Social Sciences (Accepted for Publication).

2. Al-Khouri, A.M. & Bal, J. (2007) "Digital Identities and the Promise of the Technology Trio: PKI, Smart Cards, and Biometrics," Journal of Computer Science, Vol.3, No. 5, pp.361-367. This paper was quoted in the: Summer '07 Intelligence section in MIT Sloan Management Review.

3. Al-Khouri, A.M. & Bal, J.(2007) "Electronic Government in the GCC Countries," International Journal Of Social Sciences, Vol. 1, No. 2, pp.83-98.

4. Al-Khouri, A.M. (2007) 'Electronic Identities,' Science World Journal (Accepted for Publication).

5. Al-Khouri, A.M. (2007) "Using Quality Models to Evaluate National ID systems: the Case of the UAE," International Journal Of Social Sciences, Vol. 1, No. 2, pp.117 -130.

6. Al-Khouri, A.M. (2007) "UAE National ID Programme Case Study," International Journal Of Social Sciences, Vol. 1, No. 2, pp.62-69.

7. Al-Khouri, A.M. (2007) "Using Quality Models to Evaluate Large IT Projects," Proceedings of XXI. International Conference on Computer, Information, and Systems Science, and Engineering, Vienna, Austria.

8. Al-Khouri, A.M. (2007) "A Methodology for Managing Large-Scale IT Projects," Proceedings of Warwick Engineering Conference, Warwick University, Warwick, United Kingdom, pp.1-6.

9. Al-Raisi, A.N. & Al-Khouri, A.M. (2006) "Iris recognition and the challenge of homeland and border control security in UAE," Telematics and Informatics.

10. Al-Khouri, A.M. and Bal, J. (2005) "Identity theft and the promise of the technology trio," Proceedings of 3rd Safety & Security Conference, Abu Dhabi, United Arab Emirates.

A-F3: Papers still in draft version

11. Strategic Government IT Project Management: A New Methodology

12. What goes right and what goes wrong in large government IT projects

13. Building an e-Government Infrastructure

A-F4: MAGAZINE ARTICLES (Interviews)

1. Al-Khouri, A.M. (2007) 'ID Friendly,' Computer New Middle East, Vol. 183, March, pp. 34-45.

2. Al-Khouri, A.M. (2007) 'Citizen ID Programs,' ID People.

A-F5: CONFERENCE PRESENTATIONS

2007

1. Al-Khouri, A.M. (2007) 'National ID Projects: a challenging journey', eID and Border Control in the Middle East Roundtable Meeting: A landmark debate bringing together a unique blend of the public and private sectors, March 26, Dubai, UAE

2. Al-Khouri, A.M. (2007) 'Managing ID Projects', Identity Summit, April 15-18, Dubai, UAE.

3. Al-Khouri, A.M. (2007) 'Large IT Projects: pitfalls to watch for', Card Technology & Strategies II Conference, June 11-13, Kuala Lumpur, Malaysia.

4. Al-Khouri, A.M. (2007) 'ID projects: key thoughts and lessons', Citizen ID Forum – ID World International Congress, June 21-22, Istanbul, Turkey.

5. Al-Khouri, A.M. (2007) 'Why Large Government IT Projects Fail: Some Practical Thoughts', Government Technology Summit, October 24-26, Phuket, Thailand.

6. Al-Khouri, A.M. (2007) 'The role of project management in enhancing systems security', The Middle East IT Security Summit, November 5-7, Dubai, UAE.

7. Al-Khouri, A.M. (2007) 'Project Management Pitfalls', The 2nd Government Technology Summit - Middle East, November 5-7, Dubai, UAE.

8. Al-Khouri, A.M. (2007) 'Did we miss up with our project management methodology?', ID WORLD International Congress, Nov 26–28, Milan, Italy.

9. Al-Khouri, A.M. (2007) "The Local Dimension: Knowing Who's Who," Financial times 2nd Annual Conference Combating Financial Crime: Middle East, Nov 26, Dubai, UAE.

2006

10. Al-Khouri, A.M. (2006) 'Advanced Technologies in National ID Systems', Card Technology and Strategy Conference, February 20–21, Kula Lumpur, Malaysia.

11. Al-Khouri, A.M. (2006) 'Difficulty in Managing Large IT Projects', Identity Summit, March 25–28, Dubai, UAE.

12. Al-Khouri, A.M. (2006) 'Pitfalls in Large Scale IT Projects', ID WORLD International Congress, Nov 28–30, Milan, Italy.

13. Al-Khouri, A.M. (2006) 'The Choice of Project Management Methodologies', Electronic Passport Forum, June 8–9, Paris, France.

14. Al-Khouri, A.M. (2006) 'Management of Government Projects', The Government Technology Summit and Exhibition, 03–05, Dubai, UAE.

15. Al-Khouri, A.M. (2006) 'UAE National ID Project', Global Identity Infrastructure Summit, Nov 25–26, London, UK.

2005

16. Al-Khouri, A.M. (2005) 'UAE National ID Project', InterSec 2005 Conference and Exhibition, Jan 15 – 17, Dubai, UAE.

17. Al-Khouri, A.M. (2005) 'National IDs and State Security', Security and Management Summit, April 09, Abu Dhabi, UAE.

18. Al-Khouri, A.M. (2005) 'Identity Management', Identity Summit, June 05–07, Dubai, UAE.

19. Al-Khouri, A.M. (2005) 'Biometrics in National ID Systems', Biometrics Conference, Oct 19–21, London, UK.

20. Al-Khouri, A.M. (2005) 'Personal Security', Middle East Safety & Security Conference, Nov 09–11, Abu Dhabi, UAE.

A-F6: TRAINING COURSES

Table A-F5: Interactive and Assessed Courses

	Course	Date	Hours	Institute
1.	Advanced Project Management	11/09/2006-02/02/2007 4 month Course	45 hrs	Al-Fustat Institute, Abu Dhabi.
	This intensive course was designed to help participants learn how to control complex project management issues; from managing risks and quality to managing scope and budgets. This advanced program of study provided participants with the competencies to help them align their projects with corporate strategy, direct and supervise people at every level, and control enterprise-level projects. The course also aimed to prepare participants for the Chartered Project Management Consultant examination and certification. The author attended and passed the required examination and received the CPMC professional grade. See also Section A-B7 below for more details on this award.			
2.	Managing Change in the 21st Century – Who Moved My Cheese Curriculum	09/08/2007-12/08/2007	25 hrs	Logic Management Consulting, Abu Dhabi, UAE
	This course was designed to enhance understanding of organisations, the dynamic environments in which they exist, and key issues involved in the successful management of evolving organizations. The course was intended to help participants become effective organizational members and managers. The course which was based on the famous 'who moved my cheese' book authored by Johnson, S. (2002) involved a combination of lectures, class discussion of lecture and reading materials, case analyses, and the presentation and discussion of other materials. Participants played a significant role in this active-learning process. Participants were required to make individual presentations in the class and were responsible for facilitating discussion of much of the course content.			

3.	Finance for Non-Finance Professionals	29/07/2007-02/08/2007	25 hrs (CPE credits)	Meirc Training and Consulting, Dubai, UAE.
	This program was designed for those who needed to improve understanding and use of financial information. This program was worth 25 NASBA (National Association of State Boards of Accountancy) CPE's (Continuing Professional Education Programs) credit hours. The course provided participants with understanding of financial management functions, financial statements (balance sheet, income, cash flow and retained earnings statements), company financial health interpretation, capital budgeting and cost-volume-profit analysis, and use of financial information to manage the business or their departments. The course involved many team exercises, analysis of case studies, class assignments and presentations by the participants.			
4.	e-Government / Leadership in a Networked World: An Executive Programme	26/03/2005-30/03/2005	5 days (45 hrs)	John F. Kennedy School of Government, Harvard University
	This course was very much similar to the attended Warwick post modules. The course was designed for high-level decision-makers from across the region to help them understand and develop successful, real-world approaches to technology-related issues. The program objective was to give executive decision-makers the strategic tools and perspectives that enable them to identify suitable objectives and define the means for their own customized e-government strategies; understand potential hurdles; anticipate and overcome possible obstacles; appreciate general e-government evolution and the challenges and opportunities raised by information technologies; and use themes and concepts from the program to devise their own technology-related strategies and select the resources and partners to implement them. The Kennedy school's academics reviewed and assessed with the participants global e-government experience and its application to the region. The course was taught based on Harvard Case Study teaching method to highlight how technology is being used to streamline processes and drive large- scale change in the public sector across the globe.			
5.	From E-Government to I-Government: How Information Government Will Revolutionize the Public Sector	23/05/2005-24/05/2005	2 days (16 hrs)	John F. Kennedy School of Government, Harvard University
	This program has united an elite audience of Arab and international academics, policy makers, and senior government officials to discuss the need for a paradigm shift in e-Government strategies. The two-day program offered an insight into how e-Government projects can go beyond the realm of technology and infrastructure. The aim was to develop public-centred strategies that improve the flow of information and enhance public engagement in policy making. The Information Government (i-Government) concept introduced a new dynamic dimension of e-Government. It called for more focus on the quality of information flows with a view to creating a strongly interactive public sector.			

6.	Certified Information System Security Professional – CISSP	03/07/2004- 08/07/2004	2 weeks (45 hrs)	Sites Power Training Centre
	This training course was designed to preparing participants for the Certified Information Systems Security Professional (CISSP) exam. This certification was managed by the internationally recognised and highly prestigious International Information Systems Security Certifications Consortium ISC. The exam covered ISC's ten domains from the Common Body of Knowledge (CBK), encompassing the whole of information security. The exam consisted of 250 multiple-choice questions. Participants had up to 6 hours to complete the examination. Course materials reflect the latest information system security issues, concerns, and countermeasures.			
7.	Delegation Strategies at Work	12/08/2004- 13/08/2004	13 hrs	Creativity Centre, UK
	This course was designed to provide participants with exceptional skills needed to maintain a balance in both professional and personal life. It allowed them to discover and use knowledge of work-style difference and assertive communication techniques to better prioritize, manage and achieve specific goals. Under the guidance of the course leader, participants were able to identify their individual stress level, use of coping resource management and the variety of levels of satisfaction they face in major areas of their work and life.			
8.	Business Continuity & Risk Management	31/03/2004	6 hrs	The Information & Technology Publishing Co. Ltd.
	The course was designed to expose the participants to all aspects of a holistic business continuity management program and to determine the most appropriate strategy for their organisation. This one day course explored the area of business continuity management to ensure an organization's survival through a disaster. Risk management discussion involved assessing threats which may lead to disastrous events, possible approaches to evaluating control alternatives and implementing solutions. Potential threats were presented in the form of case studies which included terrorist, criminal, industrial, natural, technological, environmental, economic and political incidents. Practical solutions to enable an organisation to protect assets, mitigate risk, manage crisis and recover after a disaster were also discussed. The role of business and external agencies was explored, as well as professional practices, standards and strategies for risk, security and disaster management.			

Table A-F6: Other Short Training Courses Attended

	Course	Date	Hours	Institute
9.	Advanced smart card security/ cryptography	08/06/2004-09/06/2004	3 days (16 hrs)	GEMPLUS, France
10.	Developing policies according to ISO17799/BS7799 Information Security Standards	22/02/2004-24/02/2004	5 days (24 hrs)	Specialised Industrial & Management Systems Co.
11.	Mapping the Future of IT and Business	20/04/2004	8 hrs	Gartner, Dubai, UAE.
12.	Re-engineering Government Organisations in the Middle East and Developing Human Resources	12/12/2004	12 hrs	Ministry of Interior, Abu Dhabi

Table A-F4: Completed IGDS Modules at Warwick University

	Module	Date	Grade
13.	Improving Personal Performance	14/02/2005-18/02/2005	A
14.	Management of Change	21/02/2005-25/02/2005	A

A-F7: BCS Fellowship Award

Fellowship Criteria

The grade of Fellow is designed for those who hold a senior position, or have an established reputation of eminence or authority (*Seniority*, *Authority* or *Eminence*) in the field of IT and are likely to have over five year's experience.

Definitions of Seniority, Authority and Eminence?

Seniority

- Within the Seniority category an individual will be at a senior level and possess IT related responsibility and knowledge.

Authority

- Under the category of Authority the individual will be recognised and respected for their knowledge and expertise which may be in a particular subject area or specialism.

Eminence

- An eminent individual will have general recognition and acknowledgement across a professional community, have excellent knowledge or expertise within a particular subject and in most cases have made a significant contribution to advancing the knowledge and understanding in that specialism. Usually there will be a substantial and well respected record of publication and public speaking recognised by peers in the wider community.

What is the full definition of SFIAplus Level 7?

Autonomy

- Has authority and responsibility for all aspects of a significant area of work, including policy formation and application.
- Is held fully accountable for actions taken and decisions made, both by self and subordinates.

Influence

- Decisions critical to organisational success.
- Influences developments within information systems industry at highest levels.

- Advances exploitation of information systems within one or more organisations and/or the advancement of knowledge.
- Develops long-term strategic relationships with customers and industry leaders.

Complexity

- Leads on formulation and application of strategy.
- Work involves application of highest level management and leadership skills.
- Has deep understanding of information systems industry and emerging technologies and implications for the wider business environment.

Business Skills

- Full range of strategic management and leadership skills.
- Understands, explains and presents complex technical ideas to both technical and non-technical audiences at all levels up to the highest in a persuasive and convincing manner.
- Has a broad and deep knowledge coupled with equivalent knowledge of the activities of those businesses and other organisations who use and exploit information systems.
- Is able to understand and communicate the potential impact of emerging technologies on organisations and individuals and can analyse the risks of using or not using such technologies.
- Takes initiative to keep both own and subordinates skills up to date and to maintain awareness of and, in own area(s) of expertise.

A-F8: CHARTERED PROJECT MANAGEMENT CONSULTANT CERTIFICATION

from Chartered Association of Business Administrators (CBA)

Certification Process

Three types of competency that credential holders are required to demonstrate are:

- Integrative Competencies
- Professional Competencies
- Cross-Disciplinary Knowledge

Integrative competencies

Integrative competencies represent the true differentiation of the CBA professionals. These competencies are the hallmark of the CBA, representing his/her capacity to envision, strategize, conceptualize and innovate. They signify the CBA's ability to combine knowledge from many sources, often in novel ways, to create economic value.

- Creating & Leveraging Knowledge
- Knowledge
- Systemic Thinking
- Future Focus
- Strategic Thinking
- Innovation
- Conceptual Skills
- Global Perspective

Professional Competencies: CBA Enabling Characteristics

Professional competencies may be thought of as "enablers" of the credential holder. They include a suite of skills, capabilities and attributes that allow the CBA to be effective and productive. Without professional competencies, the CBA would be unable to translate ideas into action or bring influence to bear on the business challenges facing companies and individuals.

- Entrepreneurial Orientation
- Stakeholder Focus
- External Perspective
- Analytical Prowess
- Organizational Insight
- Networking & Resourcing
- Recognized Expertise
- Impactful Communication
- Compelling Influence
- Dedication to Excellence
- Lifelong Learning

Cross-Disciplinary Knowledge

Most professionals have a solid knowledge base in the principles, standards and practices of their particular field or discipline. The CBA credential differs from other credentials in that it requires a broad and interdisciplinary portfolio of business knowledge and functional expertise. While the CBA professional is not expected to be an expert in each content area, he/she offers an understanding of concepts, practices, implications and inter-relationships among multiple business disciplines such as: Accountancy, Business Law and Business Planning.

A-F9: REFERENCE

A copy of the reference letter submitted to the BCS earlier by His Excellency the Director-General of Emirates Identity Authority; the government organisation where the author works for.

From: **H.E. Dr. Saeed Khalfan Al-Dhaheri**
Director General of Emirates Identity Authority (from 02/2003 to 08/2007),
Assistant Professor in the Electrical Engineering Department of the UAE University from 1995 to 2004,
Member of IEEE,
Former member of the Science $ Technology Committee of Aerospace medical Association (ASMA),
Intrim chair person of the International Morpho AFIS Group for Excellence (IMAGE) from 2006 – 2007.

Contact Telephone number +971-50-6637222
Email: dhaheri@eim.ae

Seniority

Mr. Ali Al-Khouri was the Assistant Director-General for Central Operations of Emirates Identity Authority. He Held this position from 10/05 to 03/07. During this time Ali had full responsibility for a very important sector of the authority, i.e., Central Operations. Through his distinguished leadership skills and his strategic insight Mr. Ali has demonstrated excellent work in managing this sector. He worked in autonomy and helped to formulate and apply his sector policies and more generally, the organisational policies.

Mr. Ali worked closely with me in a team to develop the organisation strategy for the authority. He was an excellent and an important team member who I was always consulting regarding the strategy of the organization. He contributed through good suggestions that helped in making good decisions for the organization.

He demonstrated excellent communication skills; he was always clear, focused and good presenter. Mr. Ali has always maintained good spirit for achievement. At hard times Mr. Ali was the motivational evangelist who played a key role in maintaining and elevating the good spirit of the staff to be more productive.

He had positively influenced development of the national ID card project to a great extent. He followed a strong methodology to supervise implementation and

development of the ID Card Project of the UAE, a very strategic project for the UAE government. He contributed to formulate users requirements, application testing and successfully managing the strategic relationship with the vendor. He successfully founded and managed the IT department during this time.

Eminence

Mr. Ali was a very eminent and popular person in the ID card business. He has travelled, attended and presented in many conferences in the US, Europe and the Middle East in IT and national ID systems development. He accompanied me to several conferences in Asia and the US and presented the UAE national ID card project in those conferences.

During his work Mr. Ali has showed a deep technical knowledge in all areas of IT including database design, GUI design, system security, system testing and other IT related activities. He was very much respected by me and his colleagues for his deep IT knowledge. The UAE national ID card project demonstrated a big challenge and complexity in which Mr. Ali Al-Khouri has successfully managed, through his technical and management experience. He always liked to implement a solid system development methodology and maintain good relationship with the vendor to insure the successful completion of the project in time.

Authority

Mr. Ali has possessed deep technical knowledge more in IT and specifically in database design, system security and systems development in general. This has gained him respect from his colleagues and more generally from people in the ID business industry. This is much appreciated by the number of publications he published and presentations made in seminars locally and internationally.